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SUMMARY OF RECENT ABSTRACTS*

VII. HELMINTHIASIS†

(Continued from p. 798)

General

A symposium organized by the American Society of Tropical Medicine and Hygiene (p. 55) dealt with helminthic infection as a cause of debility and disease. The papers covered work on trematodes, cestodes and nematodes.

BEAVER (p. 558) reviews the human diseases which can be attributed to common worms of dogs and cats.

The use of a vacuum cleaner for collecting dust for examination for helminth eggs is described by GEFTER *et al.* (p. 903); it proved to be more effective than the conventional washing-swab method.

WATKINS (p. 775) reviews the compounds used for the treatment of (mainly intestinal) helminth infections.

MCCOWEN *et al.* (p. 436) used Dithiazanine effectively in the treatment of laboratory animals with ascarid, hookworm and other nematode infections, and FRYE *et al.* (p. 436) found it useful in human *Trichuris* infection. In several papers SWARTZWELDER and his colleagues (pp. 530, 919, 1262) report trials of Dithiazanine in *Trichuris*, *Enterobius*, *Ascaris*, *Strongyloides* and hookworm infection, concluding that it is effective provided that treatment is thorough. An outstanding feature is the lack of side-effects.

ROGERS (p. 429) describes a method for estimating piperazine in urine, and shows that after a single dose equivalent to 3 gm. of the hexahydrate the rate of excretion differs greatly in different persons, about 1–30% being excreted in the urine within 24 hours.

BHASKARAN *et al.* (p. 278) found that in nightsoil compost pits the temperature rose to 40°C. and remained there for 10–15 days. The numbers of

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1958, v. 55. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on helminthiasis in this series see the August and September issues of the *Tropical Diseases Bulletin* each year since 1939.

helminth eggs were considerably reduced within one month and they were scanty or absent in 3 months. In comment Davey remarks that higher temperatures (to 60–70°C.) and better results have been achieved elsewhere.

Hookworm infection: Strongyloides

Hookworm infection exists in Portugal, especially in certain mining communities, in which it is associated with ascariasis, but PRIETO LORENZO (p. 1256) remarks that it is not an important sanitary problem. It persists in parts of Italy, in semi-rural horticultural areas where the ground is fertilized with sewage, near Brescia (POGGI and BONETTI, p. 556), in farming areas near Rome where sanitary conditions are primitive (DE MARIA and ROSSI ESPAGNET, p. 671), and in Calabria where MAGAUDDA-BORZÌ *et al.* (p. 1354 *bis*) found high incidence in children.

In Syrian cities there is almost no hookworm infection, but in the rural areas NAGATY (p. 1140) reports infection in up to 80% or more. Banana cultivation on irrigated land manured with nightsoil is particularly suitable for transmission. *Ascaris* infection is even more extensive, and other infections are fairly common.

ONABAMIRO (p. 557) reports mixed infections with *Ascaris,* hookworm and *Trichuris* in Nigerian schoolchildren living in varying sanitary conditions. Boys particularly had multiple infections, and some were heavy. LARRIEU (p. 789) reports heavy infection with hookworm in Africans of all ages in the Ivory Coast.

COLLINS (p. 903) shows that the incidence of intestinal helminthiasis has fallen in the employees at the Singapore naval base; hookworm infection has fallen more than *Ascaris* or *Trichuris* infection.

A heavy incidence of hookworm infection (65–98%) was found by HSÜ *et al.* (p. 918) in workers in Formosan coal mines, and infective larvae were isolated from soil in the pits.

An infection rate of 10·6% with hookworm was found in Susaki City, Japan, by YAMAGUCHI *et al.* (p. 1355); *Necator americanus* was the common form, but *Ancylostoma duodenale* was also found.

WEI and KUO (p. 1355) prepared an antigen from hookworms for use in an intradermal test; some false positive and false negative reactions occurred, but the authors think the test useful.

BRUMPT *et al.* (p. 190) consider that in hookworm anaemia, when the worm load is not heavy, there is likely to be a nutritional factor. They believe that anthelmintic treatment is necessary before administration of iron (though in comment Walters doubts whether other workers would accept this as a universal rule) and they have found that iron by the oral route gives as good results as by the intravenous route, and is less troublesome, and that rectal administration is ineffective. WHITE *et al.* (p. 809) in Peru found that in a group of schoolgirls infected with intestinal parasites (especially hookworms) a daily iron intake of about 25 mgm. was required to correct the haemoglobin value without anthelmintic treatment; this was not much above that which could be obtained from food enrichment and dietary guidance.

It is known that in East Africa high sickling rates are associated with areas in which *Plasmodium falciparum* is endemic, and that the geographical distribution of *P. falciparum* resembles that of hookworm. JACOB (p. 424) therefore

investigated the possibility of a relationship between sickling and the haemoglobin level (which was taken as a convenient measure of hookworm infection); no significant relationship was found.

CAILLE and BOURDIN (p. 425) report favourably on tetrachlorethylene in hookworm infection, but in some patients several courses were needed. In children VOUILLOUX and VOELCKEL (p. 1141) found it more effective than oil of chenopodium. GOODWIN and STANDEN (p. 426) found it successful after the failure of piperazine in 3 African children with hookworm infection.

Piperazine adipate appears to have some action on *Necator* infection, if given in repeated doses, but not in *Trichuris* or *Strongyloides* infections (MCFADZEAN and SMITHERS, p. 1029). NAGATY and RIFAAT (p. 920), however, found it ineffective in hookworm infection but moderately effective against *Ascaris* and *Trichostrongylus*.

In an attempt to reduce the incidence of hookworm infection in coal mines SOPRUNOV and TENDETNICK (p. 191) treated the ground with considerable quantities of spores of predacious fungi, with some apparent success. They describe the method as simple, inexpensive and effective.

By analogy with experiments conducted on the migratory powers of larvae of *Ancylostoma caninum* in compost and in human faeces used to fertilize vegetable crops, HARADA (p. 425) concludes that there is a serious danger that agricultural workers may contract hookworm infection, since the larvae can be found even on the upper parts of the young vegetables, and in the cooler parts of compost.

BROWNE *et al.* (p. 427) treated patients with *Strongyloides* infection by injecting gentian violet intravenously; this was not effective, and the injections caused venous thrombosis, and the authors do not advocate it.

Ascaris infection

High incidence rates of infection with *Ascaris* (50·4%) and *Trichuris* (20·69%) are reported from the Yaoundé region by DOBY and FOURCADE (p. 1143), especially in children of school age.

DE SILVA (p. 289) gives an account of ascariasis in Ceylon, where incidence rose to a peak of 17·7% in the fourth year of life. He describes the various clinical effects of the infection, and remarks that patients are now all treated with piperazine adipate or citrate, and one-day courses are given. In Ceylon children JAYEWARDENE (p. 427) observed that *Ascaris* was the predominant infection in towns, and hookworm in rural areas, though the trend here is towards the urban pattern. The only permanent solution is education in sanitary methods.

Ascaris infection is common in Singapore, and accounted for death in 5·5% of children brought to autopsy; KIRK (p. 672) describes a fatal case of acute pancreatitis complicating this infection.

NITZULESCU *et al.* (p. 790) give details of the temperature, humidity and consistency of agar substrate for the satisfactory development of *Ascaris* and *Trichuris* eggs. Irradiation by Cobalt 60 or X-ray was shown by VILLELLA *et al.* (p. 791) to impair the infectivity of *Ascaris* eggs, in high doses.

URABE (p. 672) reports an experiment in which 1,000 artificially hatched *Ascaris* larvae were smeared on his own lightly scarified skin, and produced local itching and eventual slight intestinal infection. Infection through the skin is therefore possible, but must be rare.

KAGAN (p. 72) has used the serum-agar double diffusion technique in studies of *Ascaris* antigens; the findings are complex and the paper should be read in full. MORISITA and MABUCHI (p. 73) describe a test for *Ascaris* infection in which antigens prepared from the faeces of infected persons give precipitates with sera from rabbits immunized with coelomic fluid from pig *Ascaris*. The test is claimed to be positive even before eggs appear in the faeces, and to become negative within 2 days of cure by anthelmintics. It is also claimed to be reasonably specific. LEIKINA *et al.* (p. 192) used a saline extract of powdered adult female ascarids as antigen for an agglutination reaction with carmine, in the diagnosis of ascariasis, obtaining positive results in 77% of infected persons. The test may be useful.

KAGAN (p. 1257) experimented with various antigens from species of *Ascaris* and *Toxocara* but failed to obtain one which exhibited species specificity as judged by the haemagglutination test.

BEAVER and DANARAJ (p. 791) describe a case in which the patient died in status asthmaticus after a short disease diagnosed as eosinophilic lung, but in which larvae, probably of *Ascaris*, were found at autopsy in the bronchioles.

GOODWIN (p. 1145) has devised a technique for recording the movements of *Ascaris* in baths of fluid, and in this way has been able to show that piperazine, which slowly narcotizes the worm, is probably a safer drug than certain others which act more quickly and may at first stimulate the worm to violent convulsive activity, in that it is not likely to lead to damage by obstruction or perforation of the intestine. Investigations by NORTON and DE BEER (p. 428) indicate that piperazine produces paralysis of *Ascaris* by blocking the neuromuscular junction.

After an extensive trial of various salts of piperazine in *Ascaris* infection in African children GOODWIN and STANDEN (p. 428) conclude that the citrate, phosphate, adipate, sebacate and stearate are about equally effective; solid preparations have various disadvantages and the authors advocate the citrate in syrup for general use. SAIF (p. 793) used piperazine citrate as a single-dose treatment, finding it effective and safe. *Ascaris* infection is common in Kivu, Belgian Congo, and ROELS-BROADHURST and DE MAEYER (p. 1144) found that house treatment for 6 days with piperazine phosphate was satisfactory to the extent that 86% of treated children were free 10 days later. ROY *et al.* (p. 290) in India use a preparation of piperazine adipate and a thiocarbanilate (1491 E) for ascariasis. Dosage schedules are quoted, some of which were very satisfactory. There were no unpleasant side-effects.

Sodium dehydrocholate promotes the secretion of bile, and TANAKA (p. 1030) after experimental work on dogs, suggests that it may be useful in clearing *Ascaris* eggs from the biliary tract.

Filarial infections

General

MATTINGLY (p. 292) has published a set of notes and comments on the taxonomy and bionomics of certain mosquito vectors of filariasis (*Wuchereria bancrofti* and *W. malayi*) which should be read in full.

Microfilariae were found by LAIRD (p. 1357) in 6 species of birds in New Caledonia; knowledge of the vectors is very scanty, but the author points out that mosquito vectors of *Wuchereria* may be involved, and field studies of infection in them might therefore lead to confusion. [Similar opinions on this possibility of error are expressed by BERTRAM *et al.* and MANSON-BAHR, below.]

LANGUILLON (p. 429) examined a large number of blood and skin samples in the Cameroons, and found *Dipetalonema perstans* (in the south) in 78%, *Loa loa* (in the south) in 24%, *W. bancrofti* (in the north) in 18%, *Onchocerca volvulus* (in the savannah) in 19·6%, and *D. streptocerca* (in the forest) in 8·7%.

Wuchereria bancrofti

A series of papers in the *Bulletin of WHO* (p. 192) deal with filariasis (mostly *W. bancrofti*), largely from the point of view of epidemiology and transmission, in India, Africa, Vietnam, Ceylon and Tahiti. There is much local information in these papers, but 2 points are of special interest. In Egypt the vector, *Culex pipiens*, breeds in wells, and control follows the provision of piped water and the filling-in of wells, and in Tahiti the control of *Aëdes polynesiensis* is difficult because of its remarkable adaptability, but it has a limited dispersal range and breeds in small containers, and sanitary measures within and for 100 metres around houses have controlled it satisfactorily.

In Gambia *Culex p. fatigans* is rare, and BERTRAM *et al.* (p. 857) think that *Anopheles gambiae* and *A. melas* are the vectors of *W. bancrofti*, but they point out that not all larvae in infected mosquitoes can be confidently accepted as *W. bancrofti*—cattle and monkeys have their own parasites and the mosquitoes feed on them [see also LAIRD, above]. In Liberia FOX (p. 244) found filarial infection in 3·6% of *Anopheles gambiae*, a higher figure than had previously been supposed. The period of greatest transmission appeared to be May–July.

Filariasis due to *W. bancrofti* is endemic in 2 areas of Nyasaland, and in one ORAM (p. 1146) found 16% infected. He discusses the clinical effects of the infection.

High infection and disease rates for *W. bancrofti* were found in a town of Uttar Pradesh by RAHMAN *et al.* (p. 430), who incriminate *Culex p. fatigans* as the vector. A survey in the poorer quarters of Djakarta showed a microfilaria rate of 10·4% in persons who had lived there 3 years or more; some clinical effects were seen, but no elephantiasis. LIE KIAN JOE *et al.* (p. 1258) recognized the parasite as *W. bancrofti* of nocturnal type. In Sarawak and Brunei DE ZULUETA (p. 194) found both *W. bancrofti* (in a few remote villages only) and *W. malayi* (in the flat coastal lands and along the large rivers). The vectors of *W. bancrofti* appear to be *Anopheles leucosphyrus* and *A. barbirostris*.

Pam is a tiny island west of New Guinea; it is covered with coconut trees and holds 250 people who showed a microfilaria rate of 26·8% and a filarial disease rate of 14·8% (*W. bancrofti*); DE ROOK (p. 74) reports 4 vectors:—*Anopheles farauti*, *Aëdes kochi*, *Culex annulirostris* and *C. p. fatigans*. He also found *Aëdes scutellaris* breeding in coconut shells, but its importance as a vector is not considered great. In comment Manson-Bahr points out that the infection rates in mosquitoes were based on wild-caught specimens, and that the possibility that they might have been infected with filariae of animals or birds was not taken into account [see also LAIRD and BERTRAM *et al.*, above].

W. bancrofti infection was formerly common in Queensland, where it was essentially an urban disease; MACKERRAS (p. 1356) shows that it has now declined below maintenance level, but *Culex p. fatigans* is still abundant in some places, though domestic breeding has been reduced.

CHUANG *et al.* (p. 291) report a new endemic area of *W. bancrofti* infection in

Taiwan, with a general infection rate of 4·8%. A high incidence of this infection has been observed in Shantung, China, and investigations by WU *et al.* (p. 921) suggest that the chief natural vector is *Culex p. pallens*. The infection is found in parts of Foochow, especially in farmers, and LIN and CH'EN (p. 1031) show that *C. p. fatigans* is the vector. There is a high content of fluoride in the local water but there is no evidence that this has any effect on the infection.

RACHOU (p. 76) reviews recent work in Brazil which has confirmed *C. p. fatigans* as the principal vector of *W. bancrofti*. Transmission occurs mainly inside houses. *Anopheles darlingi*, *A. aquasalis*, *A. bellator* and other species of *Culex* have also been found infected. DA COSTA (p. 195) found *W. bancrofti* (0·9%) and *M. ozzardi* (0·2%) in blood from 1·1% of 6,555 persons examined in various parts of Amazonia, Brazil.

GALLIARD (p. 673) shows that mosquitoes infected with *Dirofilaria immitis* tend to die earlier than uninfected mosquitoes, but that the effect was less marked with *W. bancrofti*.

GOLVAN (p. 195) has written on the technical essentials in the staining of blood microfilariae, but the paper should be read in full. With LARIVIÈRE he (p. 196) describes the appearance of microfilariae of *W. bancrofti* in centrifuged urinary deposits.

In Puerto Rico there has always been a high incidence of funiculo-epididymitis, periorchitis and hydrocele, and some workers have regarded these as largely the result of filariasis, but LICHTENBERG and MEDINA (p. 77), after an extensive study of autopsy and surgical material, suggest that multiple aetiological factors are involved, rather than filarial infection alone. GRATAMA (p. 293) describes from Liberia a condition of acute necrosis of the scrotal skin in patients with filariasis, and suggests that the two conditions may be related.

In New Caledonia LACOUR and RAGEAU (p. 794) report that the non-periodic *W. bancrofti* is transmitted by *Aëdes vigilax*, an Australian species, and not by members of the *scutellaris* group. They point out that developing filarial infections have been found in other species, but that the situation may be confused by the fact that animals and birds suffer from filarial infection which is carried by mosquitoes.

In Tahiti LAIGRET *et al.* (p. 430) treated patients with elephantiasis by bandaging and the use of cortisone and prednisone, with considerable improvement in the swelling, in the texture of the skin, and in their subjective symptoms. MARCH and LAIGRET (p. 1032) report a bullous eruption on the limbs in 1% of persons treated in the Society Islands for filariasis with diethylcarbamazine; it could be controlled by cortisone and prednisone. In comment Hawking notes that the reaction has not been reported elsewhere.

ENGEL *et al.* (p. 922) gave an adrenal inhibitor to subjects with *W. bancrofti* infection and made counts of microfilariae and eosinophils every 1½ hours for 24 hours. The microfilarial periodicity was not greatly affected.

Wuchereria malayi

In 2 areas of Assam BASU (p. 559) found filariasis (mostly *W. malayi* but some *W. bancrofti*) in 4·5% and 7·9% of tea-garden populations. The highest rates were in immigrant labour and he surmises that the infection was imported. Antimalarial spraying does not seem to have reduced the population of *C. p. fatigans*.

GRIFFITH *et al.* (p. 624) in North Perak found filarial infection in *Anopheles*

barbirostris, which was presumed to be *W. malayi*; this led to the discovery of a previously unsuspected focus of filariasis.

GALLIARD (p. 431) gives an account of filariasis due to *W. malayi* in Malaya and in Travancore and discusses at length the question of the association between filarial infection and disease manifested by elephantiasis and other clinical signs.

In Netherlands New Guinea the common species of mosquitoes which bite indoors are *Mansonia uniformis*, *M. papuensis* and *M. longipalpis*; VAN DIJK (p. 1260) shows that *M. uniformis* is a common vector of *W. bancrofti* (which is hyperendemic), and *M. papuensis* may also be important, but *M. longipalpis* apparently could not support full development. In New Guinea VAN DEN ASSEM and METSELAAR (p. 1260) observed that larvae of *Mansonia uniformis* could be found in association with several different host plants, and would attach themselves to garden weeds and grasses placed in water. They showed no preference for *Pistia*, and it seems to be the behaviour of the female mosquito, not the choice of host plant by the larvae, which determines larval habitat.

TURNER and EDESON (p. 293) confirm observations that nocturnal periodicity occurs in *W. malayi* in some parts of Malaya but is much less marked in other areas, which may be quite close. This may be due to different biting habits of the *Mansonia* vectors, but the correlation is not absolute, or there may be two separate forms of the worm. Surveys should therefore be made after nightfall in the relevant areas, especially where periodic *W. bancrofti* occurs, which might otherwise be missed.

WHARTON (p. 296) describes his technique for breeding *Mansonia uniformis* and *M. longipalpis* in the laboratory.

EDESON and WHARTON (p. 196) dissected infective larvae of *W. malayi* from *Mansonia uniformis* which had been fed on a human carrier, and inoculated them subcutaneously into 5 cats, which became infected and in turn produced microfilariae and (in 2 cases) adult worms indistinguishable from those of human infections. These microfilariae developed normally in the vector mosquitoes. The success of these experiments makes further study of development and chemotherapy possible, and raises epidemiological problems. WHARTON (p. 294) studied the development of *W. malayi* in *Mansonia longipalpis* and *M. bonneae*, which are very receptive to it. Migration of the microfilariae was almost complete after 12 hours and it is assumed that any mosquito found in nature with infective larvae in any part of the body should be regarded as infective to man. The important point in assessing vector efficiency is the number of mature larvae produced. WHARTON (p. 795) investigated the efficiency of *Mansonia longipalpis* as an experimental vector of *W. malayi*, showing that there is a direct relationship between the density of microfilariae in the blood at the time of the blood meal, and the average number of larvae found per mosquito, and concluding that there is no non-infective microfilarial level in the blood other than zero. Maximum numbers of infective larvae were obtained when the mosquitoes fed on heavily infected persons (3–11 microfilariae per cmm. blood) but the heaviest infections caused high mortality in the mosquitoes 8 days after the feed.

WHARTON *et al.* (p. 1261) have succeeded in infecting laboratory-bred *Mansonia uniformis* with *W. malayi* from a human carrier, and transmitting the parasites to cats by bite.

EDESON and WHARTON (p. 922) found that treatment of carriers of *W. malayi* with diethylcarbamazine (5 mgm. per kgm. once a week or once a month for 6 doses) could reduce the human microfilarial reservoir to a very low level, but they refer to the fact that forest monkeys and domestic cats have been incriminated as hosts. WHARTON and SANTA MARIA (p. 923) found that dieldrin at 100 mgm. per square foot caused high mortality in *Mansonia longipalpis* in Malayan houses and may therefore be useful in the control of *W. malayi*, but they point out that this mosquito also bites avidly in the forest, and that there is an animal reservoir from which transmission may occur.

In the house spraying campaign with dieldrin against *Mansonia* species in Malaya WHARTON (p. 1176) observed that *Culex p. fatigans* began to display resistance to dieldrin and BHC, and slightly to DDT.

Wuchereria patei

BUCKLEY *et al.* (p. 1262) describe a new species, *Wuchereria patei*, from cats, dogs and genet cats on Pate island off the Kenya coast; it belongs to the *W. malayi* group.

Tropical eosinophilia

The aetiology of eosinophilic lung is obscure, but DANARAJ (p. 920) believes that it may be related to some kind of filarial infection of animal origin, man being an unsuitable host in whom full development cannot take place. This view is supported by the fact that he has had very great success in treating 110 patients with diethylcarbamazine, with clinical relief, clearance of abnormal lung signs, and marked decrease in the eosinophilia.

Such patients do not show microfilariae in the blood, but complement-fixation tests with filarial antigens are often positive. BUCKLEY (p. 1356) reports 2 experiments on a volunteer in which infective larvae from *Mansonia uniformis*, which had fed on a monkey naturally infected with *Wuchereria* sp. (? *malayi*) or a cat carrying *W. pahangi*, were injected without in either case causing microfilaraemia, but in each case followed (in 10 and 14 weeks respectively) by most of the accepted signs and symptoms of tropical pulmonary eosinophilia.

SADUN *et al.* (p. 74) believe that tropical eosinophilia may be due to invasion of the viscera by *Toxocara* larvae and they have developed serological tests in which an antigen is prepared from the adult worms or eggs and is used with sera from infected animals or human beings; flocculation and complement-fixation techniques were used and apart from cross reactions with some animals infected with *Ascaris*, the results were fairly specific, but more work is needed before the test can be relied upon.

Litomosoides carinii

Introduction of fourth-stage larvae or adult *Litomosoides carinii* into the abdominal cavity or (less effectively) under the skin of cotton rats confers some immunity against subsequent infection (SCOTT *et al.*, p. 673). This immunity appears to persist for long periods after the death of the primary infecting worms, which probably continue to act as antigens after death; MACDONALD and SCOTT (p. 1359) suggest the term " postmunition " for this phenomenon.

Onchocerca volvulus

In a collection of papers on onchocerciasis published by WHO (p. 79) various authors discussed the eye lesions, the vectors (*Simulium damnosum* and *S. neavei* in Africa, *S. ochraceum*, *S. metallicum* and *S. callidum* in Guatemala), and their control by the dosing of rivers with DDT (minimum 0·5 p.p.m. for 30 minutes every 10 days for 3 months). Comments are also made on the value of suramin, sodium stibogluconate and diethylcarbamazine in treatment, and in comment Waddy notes that the reaction of onchocerciasis patients to suramin is extremely variable.

O'Brien (p. 1359) reports a high incidence of onchocerciasis in southern Ghana, but eye lesions are not reported from this area, which is hilly tropical forest area where the standard of nutrition is high.

In Northern Nigeria Crosskey (p. 433) found infection in up to 16·8% of *S. damnosum* in the rainy season. Infection rates were lowest when flies were most abundant and highest when the numbers of flies were moderate. It is suggested that infections in some Africans, especially fishermen, may be particularly severe because they frequent rivers when transmission is at its highest level.

Although it was not known before, a survey by Morgan (p. 1147) showed that onchocerciasis does occur in the north of the Sudan, where *S. damnosum* has been reported for over 100 years. This is 1,000 miles from the nearest recognized endemic area. Nelson (p. 1360) reports a high incidence of onchocerciasis in north-west Uganda. Eye lesions were found, but only of the anterior segment, and blindness attributed to the infection was rare. Enlarged and even pedunculated inguinal and femoral glands were common. In Kenya the vector of *O. volvulus* is *S. neavei*, whose larval stages are carried on crabs; McMahon *et al.* (p. 1361) describe the procedure found successful in eradicating *S. neavei* by 9 cycles of treatment of streams with DDT at intervals of 10–14 days. McMahon (p. 81) describes 2 other species of *Simulium* which, like *S. neavei*, breed in association with fresh-water crabs; they have not been incriminated as vectors of *O. volvulus*.

In a river area in the Ivory Coast Blanc *et al.* (p. 1034) found various species of *Simulium*, including *S. damnosum*; they discuss biological features and the use of DDT in larval control.

Lewis (p. 297) gives an account of the structure and biology of *S. damnosum*, for details of which the original should be consulted. It has been reared in Ghana from eggs in an aquarium, and Wright (p. 298) gives an account of the technique used. Muirhead-Thomson (p. 433) in Liberia observed that eggs of *S. damnosum* are susceptible to drying and are unlikely to survive the dry season. He (p. 298) has succeeded in observing the development of infective larvae of *O. volvulus* in laboratory-bred *S. damnosum*; it has previously been very difficult to study the course of development in other than wild-caught flies.

Nelson (p. 1360) describes a technique for staining filarial larvae in mosquitoes (and *Simulium*) before dissection.

Rodger and Brown (p. 561) have devised a method of assessing the density of infection with *O. volvulus*, based on the anatomical distribution of the microfilariae. This involves examination of conjunctival and skin biopsy material (neck, chest, thigh and calf). They consider that a safe level of infection exists at which there is no risk of blindness. The method can be

applied to community surveys. In describing the posterior degenerative lesions of the eye in onchocerciasis RODGER (p. 434) suggests that onchocerciasis alone is not enough to produce them and that they do not appear unless there is also serious deficiency of vitamin A; the onchocercal element is probably a toxin liberated by free adult worms. In comment Choyce suggests that they may be degenerations of a hereditary nature accelerated by vitamin A deficiency.

LAGRAULET *et al.* (p. 300) describe the clinical and pathological findings in 3 onchocerciasis patients with typical anterior and posterior segment lesions.

A symposium on onchocerciasis is reported on p. 925. ADAMS stated that in European patients seen in Liverpool the ocular complications were rare, but WOODRUFF *et al.* in London reported 26 patients with ocular complications in 72 treated; in Calabar, on the other hand, ocular complications in Africans were rare, though the infection rate was high. Diethylcarbamazine and suramin are the drugs of choice, a conclusion confirmed by HAWKING. The ocular lesions were discussed by CHOYCE, who, though admitting the frequency of anterior segment lesions, strongly disputed the common opinion that onchocerciasis is a serious blinding disease, and gave his opinion that posterior segment lesions usually attributed to it are of different aetiology, some being of genetic origin. KERSHAW supported this opinion, but other speakers in a lively discussion by no means accepted it.

In Mexico RUIZ REYES (p. 929) concluded that the incidence of ocular lesions associated with onchocerciasis had decreased considerably in recent years, when treatment with diethylcarbamazine and extirpation of nodules have been widely carried out.

D'HAUSSY *et al.* (p. 1048) describe the lesions of the fundus of the eye in onchocerciasis; the anterior segment lesions followed the usual pattern, but the fundus lesions varied, and the authors discuss the possibility that they may have been due to causes other than onchocerciasis.

"Hanging groin" is a sac of atrophic skin containing sclerosed glands in a matrix of connective tissue and lymph exudate. NELSON (p. 1148) reports it as present in all areas of Uganda heavily infected with onchocerciasis, and notes that all affected persons have severe, chronic onchocerciasis.

Treatment of onchocerciasis with diethylcarbamazine often leads to allergic reactions, and the use of antihistamine drugs is not always successful in relieving them; PACHECO SANCHEZ and RUIZ REYES (p. 674) report good results from a synthetic analgesic (Magnopyrol, a derivative of antipyrin) in such cases. MARKELL and TURNER (p. 82) show that simultaneous treatment with prednisone greatly reduces the incidence of allergic reactions in onchocerciasis patients treated with diethylcarbamazine, and that there was no interference with microfilaricidal action.

MUIRHEAD-THOMSON (p. 299) developed a laboratory technique for studying the effects of insecticide on larvae of *S. damnosum*. He gives details of his findings with different concentrations of DDT and dieldrin, which should be sought in the original abstract. In general, dieldrin appears to be effective in concentrations at least 10 times lower than for DDT.

Loa loa: Dipetalonema streptocerca

DUKE (p. 924) studied the biting habits of various species of *Chrysops* in the rain forest area of the Cameroons. High infection rates with *L. loa* were

found in *C. langi* and *C. centurionis* which bite at dusk and probably carry the parasites in the monkey population. The rates for *C. silacea* and *C. dimidiata*, which bite in the daytime, were lower, but these are probably responsible for spread in man.

LAVOIPIERRE (p. 1032) has established that microfilariae of *L. loa* in *Chrysops* invade cells of the fat body, and after bursting from them migrate to the thorax, through the neck to the head. Most of the infective forms escape from the fly, while it is feeding, by rupturing the delicate labio-hypopharyngeal membrane. The mechanism of emergence depends on events which occur while the fly is taking a blood meal, which the author discusses. LEBIED (p. 796) describes the process of development of *L. loa* in *Chrysops*, in which the microfilariae are described as being surrounded in the haemocoele by fatty cells which fuse to form a syncytium.

SCHOFIELD (p. 197) used *Dirofilaria immitis* antigen in complement-fixation tests for loiasis, and found that the test was positive in all patients who gave histories of 1–3 years, but that those with very short or very long histories gave a high proportion of negative results. These differences probably reflect changes in the host-parasite relationship. The test was only rarely positive in *D. perstans* infection, and in these cases there may have been infection with another filarial species.

BAUER *et al.* (p. 78) report a case of loiasis in which severe cerebral disturbance occurred which was attributed to local allergic reaction due to the infection. Diethylcarbamazine cleared up the Calabar swellings and the brain lesion.

DUKE (p. 560) reports infection with *Dipetalonema streptocerca* in a patient in the Cameroons, in whom, contrary to usual experience, the infection produced an itching eruption of the skin which was eventually cleared up by diethylcarbamazine. He (p. 1358) reports experiments which indicate that *Culicoides milnei* is much less readily infected than *C. grahami* with *D. streptocerca.*

Mansonella ozzardi

Mansonella ozzardi is highly prevalent along certain rivers in Brazil; LACERDA and RACHOU (p. 1259) found that the incidence of *W. bancrofti* in those areas was low. By transfusing blood containing microfilariae of *M. ozzardi* into persons free from this parasite MAZZOTTI and PALOMO (p. 78) showed that the microfilariae can live more than 2 years after transfusion. BIAGI and CASTREJON (p. 77) note that infection with *Mansonella ozzardi* produces eosinophilia which is most intense and constant soon after infection.

Dracunculus medinensis

PAREKH and KULKARNI (p. 796) describe the clinical course of dracontiasis in India, and note that treatment with various drugs, including diethylcarbamazine, was ineffective. Incidence is highest in the south and west, and control involves the abolition of step-wells, the use of fish which eat cyclops, and of chemicals like DDT. The best control would be a piped water supply.

Gnathostoma infection

ANDO (p. 435) shows that various substances derived from *Gnathostoma spinigerum* adults or larvae can be used as antigens for skin tests on patients infected with this worm, with some success.

Enterobius and Trichuris infections

BIGUET *et al.* (p. 198) found a high rate of infection with *Enterobius* in a psychiatric establishment in France, and conclude that adults have no immunity, spread depending on crowding and on the absence of hygiene in mental patients. COUTELEN *et al.* (p. 437) in northern France found *Enterobius vermicularis* in 57·5% of 132 appendices removed from children, though only rarely had that infection caused the appendicitis. They draw attention to the need for greater efforts to eradicate the infection. In the French Cameroons DOBY *et al.* (p. 199) found *Enterobius* in up to 90% of white children and 45% of African children. The rates were highest in schoolchildren.

INATOMI (p. 562) describes a study of the egg shell of *Enterobius* with the electron microscope.

BUMBALO *et al.* (p. 1150) used piperazine citrate syrup and pyrvinium citrate for the treatment of enterobiasis in children. Each gave good results and each was well tolerated. The authors favour piperazine citrate, but for a rather longer period of time than they allowed in these tests. HILL (p. 675) reports an acute urticarial reaction in a child treated with piperazine citrate for *Enterobius* infection. A course of the same drug had been given 3 months before.

BUMBALO *et al.* (p. 301) tried promethazine and pyrathiazine, derivatives of phenothiazine, in enterobiasis, but the results were poor; moreover JAMES (p. 1362) reports 2 cases in which severe mental side-effects were produced by promethazine hydrochloride, which indicate that this treatment is unsuitable.

After tests with various substances LIPKOVÁ (p. 83) concludes that for practical disinfection of closed spaces in children's institutions for *Enterobius* eggs, chloride of lime and chloramine are the most appropriate.

Phthalofyne has been found a safe and effective remedy for trichuriasis of dogs, and TELFER *et al.* (p. 1149) tried it by mouth or by the bowel in man. There were some severe side-effects, and no serious effect on the worms was noted, but other methods of administration may deserve trial.

Trichinella infections

An outbreak of trichinosis in 7 persons who ate sausage made from a privately slaughtered pig in Italy is described by BERNI and MASSI (p. 200). They emphasize the importance of inspection and control.

A suggestion has previously been made that trichinosis may be transmitted by contamination of butchers' knives or the hands of persons handling infected meat; GIBSON (p. 930) has now shown that small numbers of larvae can be recovered from such knives.

HILL (p. 201) describes the distribution of *Trichinella* larvae in the tissues of infected pigs; the diaphragm was always infected, but larvae were found in many organs also. RITTERSON (p. 201) describes the findings in infected Chinese hamsters.

GOODCHILD (p. 84) studied the infection of rats after larvae of *T. spiralis* had been implanted into prepared intestinal fistulae; the original paper should be read.

A rapid flocculation test described some years ago was recently evaluated in trichinosis by SUESSENGUTH *et al.* (p. 200), who found it highly sensitive and

specific. Cholesterol crystals are coated with an alkaline extract of lyophilized *Trichinella* larvae, and these flocculate when mixed with serum from an infected person.

In Poland KOZAR *et al.* (p. 1363) used the intradermal test with a *Trichinella* antigen which is described, for diagnosis of the infection. The test is useful, tending to become positive some 38 days after infection. It is also useful for assessing the prevalence of the infection in a community. Repeated injection of antigenic material associated with excretions and secretions of adult *T. spiralis* is capable of producing some degree of immunity in mice; CHIPMAN (p. 562) comments that both the adult and the pre-adult phases contribute to the total immunity produced by the host.

MAVOR (p. 1151) reports a case in which involvement of the central nervous system was associated with trichinosis.

GREENSTEIN and STEINBERG (p. 797) have used corticotrophin with success for the serious complications of trichinosis, and MARKELL and LEWIS (p. 438) show that administration of cortisone for long periods after infection of rats with *T. spiralis* interferes with immunity to reinfection even though in animals treated for 30 days only there might be a high titre of circulating antibodies. They think that resistance may depend upon tissue hypersensitivity, which may be masked by cortisone. MARKELL (p. 931) shows that treatment of rats with cortisone after infection greatly increased the number of larvae which eventually developed in their muscles.

LARSH and GOULSON (p. 85) found cadmium oxide by mouth effective in the treatment of mice.

Pseudogordius infection

YEH LIANG-SHENG and JORDAN (p. 439) describe a new gordiid worm passed by a girl in East Africa, which they name *Pseudogordius tanganyikae*.

Charles Wilcocks

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

SMITH, A. & DRAPER, C. C. **Malaria in the Taveta Area of Kenya and Tanganyika. Part I. Epidemiology.** *East African Med. J.* 1959, Feb., v. 36, No. 2, 99–113, 1 map. [12 refs.]

This account concludes the preliminary epidemiological survey of the Taveta-Paré area of which the Paré portion was described by DRAPER and SMITH [this *Bulletin*, 1957, v. 54, 917]. The Taveta portion lies at an average altitude of 2,500 ft. at the base of Mt. Kilimanjaro where water rises in numerous springs which have encouraged forest growth and which has latterly been diverted for irrigation. The facility for breeding, especially of *Anopheles*

funestus, and the somewhat raised humidity have favoured an exceptionally intense transmission which has caused the area to be the subject of several well-known studies, but de-forestation and diversion of the water may have been lessening the transmission in recent years.

The entomological records include accounts of vector densities in huts (up to 66 *A. gambiae* and *A. funestus* in and near the forest region); of the gonotrophic cycle (2 to 3 days); of movements of mosquitoes to and from houses; of host choice, showing a 90% anthropophilic index, though *A. gambiae* shows some local variation according to the availability of outdoor resting places and of cattle; and of outdoor biting, the captures being small in relation to those made indoors. All of these would indicate a very high prevalence of transmission but the sporozoite rates were relatively low—0·66 and 0·70% for *A. gambiae* and *A. funestus* in the forest and 0·1 and 0·37% for the same two species outside. Even so it would appear from entomological information that a person in the forest would receive on average 12 to 26 infective bites in the year and a person outside it, 2 to 14. The spleen and parasite indices in and near the forest are typical of holoendemic malaria while those taken outside it indicate a slightly lower intensity.

In discussion it is noted that *A. funestus* feeds almost entirely on man and is predominantly found in huts but *A. gambiae* is more readily diverted to cattle if they are numerous and opportunities for resting are found near them. Relatively low sporozoite rates are attributed to the short mean life of the mosquito as the result of a relatively arid climate. Comparison with past records shows that there has been a general decrease in sporozoite rates and at the same time an amelioration of the malarial condition, possibly due ultimately to the thinning of the forest and consequent drying of the atmosphere.

G. Macdonald

BLACK, R. H. **Haptoglobins and Haemoglobins in Australian Aborigines.** [Correspondence.] *Med. J. Australia.* 1959, Jan. 31, v. 1, No. 5, 175–7. [16 refs.]

This letter refers to the paper by BUDTZ–OLSEN [this *Bulletin*, 1959, v. 56, 477] who found no abnormal haemoglobins in Australian aborigines.

The history of malaria in Australia has considerable significance in relation to current theories on the selection of the sickle-cell trait by *Plasmodium falciparum* infections, against which it gives some protection. It is stated that malaria has been recently imported [*ibid.*, 1956, v. 53, 647], but this can reasonably be questioned. The disease in Australia has certainly been very unstable, marked by periods of epidemic prevalence separated by intervals of apparent virtual absence. Records of its occurrence are understandably discontinuous, dating back from the well-known *P. falciparum* epidemic of North Queensland in the mid-1930's, through a series of other happenings which are progressively less adequately documented, to accounts of intermittent fever in 1824 in the first European settlement at Fort Dundas on Melville Island. There must have been frequent opportunities for re-introduction very soon thereafter because trade was then opened with Timor.

However, there is clear evidence that Australia had been repeatedly visited before this first formal European settlement; by Europeans, Captain Cook

among them ; and by Torres Strait islanders who certainly migrated northwards to Papua and southwards to Australia, and aborigines in contact with them are known to have had malaria before the first European settlement in the area concerned. There has also been prolonged trade by Malays travelling between Australia, Celebes, Timor and other places. Here was a well-established and continually recurring mode of entry for malaria which had been in existence for a long time before the arrival of Europeans.

The fate of the malaria which was doubtless introduced may well have followed the evanescent pattern which has been well demonstrated in recent times. It is reasonable to think that epidemic *P. falciparum* malaria may have occurred and *P. vivax* malaria may have been endemic. If from time to time the disease died out there was ample means for its renewal. *G. Macdonald*

COLBOURNE, M. J. **Malaria in Infancy.** *Central African J. of Med.* 1959, Feb., v. 5, No. 2, 65–9. [35 refs.]

The author reviews the mortality and morbidity due to stable malaria on the basis of his own experiences in Ghana and Sarawak and of the literature. He concludes that malaria in these conditions causes the death of about 5% of children before they reach the age of 5 years. The pattern of morbidity is confused, some infants being relatively unaffected, others retarded, while a remaining group suffer a severe clinical disease. The effect on the general child population is some retardation of growth and development which is, however, later made up.

He then reviews the parasite rate in infants, the practical points to be taken into account in its assessment, and its value in the study of the malaria situation and the progress of a control or eradication campaign. Infants may be insufficient in number for the collection of statistically reliable rates ; it may be hard to estimate their age ; in some communities happenings among the children may be dissimilar from those among adults because they receive much greater protection against bites, or mosquitoes may select older people as a source of blood. Confusion is introduced, too, by the manifest difference often found between the inoculation rate as it would be estimated from entomological data and as it appears from parasitological study. The author concludes that no better measure exists than this rate for the estimation of the intensity of transmission during the preceding 12 months, but that the rate should be interpreted with caution. [" . . . the term itself (the infant parasite rate), which suggests infection with a tiny trophozoite, scarcely weaned from the schizont." *Touché*!] *G. Macdonald*

FOX, R. M. & WEISER, J. **A Microsporidian Parasite of** *Anopheles gambiae* **in Liberia.** *J. Parasitology.* 1959, Feb., v. 45, No. 1, 21–30, 6 figs. [17 refs.]

"*Nosema stegomyiae* infections of *A. gambiae* and *A. melas* from Liberia were studied both in fresh preparations and from stained serial sections of infected mosquitoes. Diseased mosquitoes cannot be recognized from external

characteristics but can be diagnosed from dissection of the midgut. Sectioned material shows that the microsporidian invades all organs and tissues except the air sacs, tracheae and coelomic lumina. Parasites enter at the mouth; esophageal and salivary gland tissues are infected at the outset and the infection spreads along the alimentary tract, including the malpighian tubules, and then to fatty tissues, muscular tissues, ganglia, and circulatory epithelium and phagocytes. In undifferentiated ovarian follicles the epithelial, interstitial and nurse tissues are involved, leading to follicular atrophy and a curtailing of the number of eggs produced.

" Differences in morphology and pathology between this infection and those recorded by other authors are noted. These are slight and probably depend upon differences in the host species concerned.

" Transmission is probably oral through ingesting contaminated food; trans-ovarian transmission does not seem to occur; no infected larvae were found.

" In *A. gambiae* having nosematosis, *P. falciparum* oöcysts develop only where the *Nosema* infection is light because the midgut epithelium disintegrates after invasion of the parasite and thus denies suitable lodging to the *Plasmodium* oökinetes.

" Fumidil B, an antibiotic developed by Abbott Laboratories for use against nosematosis in honey bees, also is effective against *N. stegomyiae* in *A. gambiae* but its action is too slow to be useful in treating infected mosquito colonies. The best control is prophylatic sterilization of all cages and equipment."

SRICHAIKUL, T. **A Study of Pigmentation and other Changes in the Liver in Malaria.** *Amer. J. Trop. Med. & Hyg.* 1959, Mar., v. 8, No. 2, Pt. 1, 110–18, 3 figs. [16 refs.]

In 25 patients with malaria in Bangkok, liver function tests were performed and liver biopsies obtained, the latter to assess the amount of malarial pigment deposited. The state of the liver was determined by the thymol flocculation test and by the iodine test, as well as by physical examination.

The iodine test, with which some readers may not be familiar, has been described by MALLEN *et al.* (*Amer. J. Clin. Path.*, 1950, v. 20, 39), and consists in the mixing of a drop of Lugol solution with serum on a slide. Precipitation occurs when there is an abnormal albumin globulin ratio and an increase in gamma globulin [this *Bulletin*, 1953, v. 50, 1101].

The thymol flocculation test was more commonly positive in malaria than the iodine test, but the author could not find any relation between the degrees of positivity and the severity of malaria.

Liver biopsy was performed in 23 patients and in 5 controls. The controls showed neither malarial pigment nor any structure which resembled malarial pigment. In 19 of 23 patients, of whom 11 were suffering from *P. falciparum* malaria and 8 from *P. vivax* malaria, pigment was found in the Kupffer cells. It could be seen as early as 6 days after the first clinical symptom and as late as 6 months afterwards. Its disappearance was related to the amount of pigment deposited at the beginning of infection. There was no constant relation between the results of the serum protein lability tests, the amount of pigment, the degree of parasitaemia, and general pathological changes in the liver.

H. Lehmann

RATHSCHECK, H. J. Klinische Untersuchungsergebnisse über die parenterale Verabfolgung von Propoquin (PAM–780), ein neues Anti-Malaria-Mittel. **[Clinical Trials of Parenteral Administration of Propoquine (PAM-780), a New Antimalarial]** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Apr., v. 10, No. 1, 36–7.

The English summary appended to the paper is as follows:—

"PAM-780 (Propoquine), a new anti-malaria agent, was intramuscularly injected to 70 patients. In all but two cases, where a second dose proved necessary, parasitemia and fever had disappeared after 48 hours. Only three patients, having received 300 mgs of the drug, developed such secondary effects as temporary slight nausea and giddiness. In this respect Propoquine is superior to Nivaquine."

WORLD HEALTH ORGANIZATION. TECHNICAL REPORT SER. No. 162. **Expert Committee on Malaria. Seventh Report.** Lisbon, 15–23 September 1958. 51 pp. [Refs. in footnotes.] 1959. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [3s. 6d.; $0.60; Sw.fr. 2.–.]

The Expert Committee, in its 6th Report [this *Bulletin*, 1958, v. 55, 248], undertook the considerable task of writing what amounted to a complete manual of malaria eradication for which there were no previously accepted mechanisms. In the present report, just two years later, it has reviewed the working of its recommendations and made such corrections and elaborations as experience has proved necessary. On the whole the mechanism previously proposed has shown itself to be workable and the review has involved crossing the "t"s and dotting the "i"s of the previous recommendations more than the rejection of any substantial part of them or the substitution of any new material.

The report therefore deals with a large number of subjects, several of which are briefly studied. Most attention is paid to the evaluation of eradication campaigns, and it seems probable that too little emphasis had previously been given to the strictness of the standards required. The whole concept of proof of the absence of transmission or the absence of residual cases differs from that of measurement of a known prevalence, which is the normal function of a malariologist, and it requires quite separate methods. In many cases it requires the abandonment of the concept of random sampling and the substitution of carefully placed bias of emphasis of search towards places where spraying may perhaps have been inadequate. There are, too, reasons why passive search for cases, which has proved very effective in many campaigns, may have a bias in the wrong direction, being most thorough in places where previous spraying activities were most successful; the institution of some degree of active search is therefore recommended in all conditions. Previously it had been proposed that this should largely be through the taking of blood films from a large proportion of the population. Experience, however, has shown that by far the largest proportion of positive films are found in persons with some recent record of fever, and figures are given to substantiate this. It is suggested that some concentration of effort should be made by search for persons with fever, from whom alone it might be necessary to take blood films. Further study should be made of the means by which a few residual

positive persons might best be discovered. Study is also needed of the significance of the chronic carrier with a few gametocytes in his blood, with quantitative data on the number of mosquitoes he might infect and of the significance of these slightly infected mosquitoes to the population as a whole.

The other subject of main interest is the reference to resistance to insecticides. Past fears have proved justified and an appended list of fully established cases includes 15 examples in *Anopheles albimanus, A. aquasalis, A. gambiae, A. quadrimaculatus, A. sacharovi, A. stephensi, A. subpictus* and *A. sundaicus,* while a number of reported but as yet not fully confirmed cases were then under examination. A considerable intensification of research is recommended, and it is proposed that major field trials of the value of organophosphorus insecticides in the control of malaria should be established to build up a background of knowledge to be used if resistance to both groups of chlorinated hydrocarbon insecticides should invalidate their use. Resistance of the parasites to drugs, particularly pyrimethamine, has been observed but has not yet achieved major significance. The need for a very careful education of the public in relation to eradication campaigns is stressed.

Later sections of the report deal with subjects which have arisen in particular localized contexts such as the eradication techniques best applicable in hypoendemic areas where the full weight normally advised may not be appropriate and the protection of people living in temporary shelters, which has proved a major difficulty in many campaigns. It had perhaps not been recognized how large a proportion of the population might spend much of its time in temporary housing in rice fields or elsewhere to protect their crops, and how difficult it might prove to include them in an eradication campaign. Note is taken of the action of the Committee on International Quarantine to authorize a limited form of quarantine of migrant seasonal workers and the movement of resistant mosquitoes (*Official Records WHO*, 1958, No. 87, Annex 1, p. 413).

Other material discussed includes the use of drugs in eradication campaigns, standard treatments, the field use of medicated salt, current problems other than resistance in the use of insecticides, recent evidence on the toxicity of dieldrin, the uniform designation of insecticide doses, training of epidemiological staff, and the analysis of the cost of surveillance.

[The report ends with a note that a recommendation was made for the award of the Darling Medal and Prize. The award has since been given at the 15th World Health Assembly to Dr. E. J. Pampana, who has now retired from the post in WHO which he held with such distinction and in which he contributed so materially to the knowledge of the techniques by which malaria might be controlled and then eradicated.] *G. Macdonald*

Ciucă, M. *et al.* Rezistența fiziologică la insecticide a unor specii anofeliene vectoare, factor determinant de interferentă in desfăsurarea acțiunii de eradicare a malariei. [**Physiological Resistance to Insecticides in Certain Anopheline Vectors as an Interfering Factor in the Anti-Malaria Campaign**] *Studii si Cercetări Inframicrobiol., Microbiol. si Parazitol.* 1957, v. 8, No. 4, 625–45, 1 fig. [28 refs.] French summary.

An investigation has been made of the resistance to lindane and DDT of mosquitoes of the genus *Anopheles* collected in 2 areas in Rumania which

had been dusted with these insecticides for 8 years in the course of malaria eradication measures. Among 8,584 mosquitoes collected in an area on the Black Sea coast the mortality, determined by the method of Busvine and Nash, was 50–97·3% with 0·02% lindane, 47·5–100% with 0·04% lindane and 87·5–100% with 2% DDT. Among 13,984 mosquitoes caught in the Iasi area the mortalities with the same concentrations of insecticides were 19–76%, 19–36% and 12–56% ; among 2,505 mosquitoes from the same area tested by the micropipette method the mortality with a dose of 0·2–0·54 μgm. was over 90%. In the first area control by dusting had been effective and the density of mosquitoes was very low. *D. J. Bauer*

BROWN, A. W. A. **Laboratory Studies on the Behaviouristic Resistance of** *Anopheles albimanus* **in Panama.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 6, 1053–61.

In the report of TRAPIDO, 1954 [this *Bulletin*, 1955, v. 52, 512] it was noted that in two villages (Gatuncillo and Santa Rosa) on the Rio Chagres, Panama, where DDT had been sprayed for some years, populations of *Anopheles albimanus* were hyper-irritable to this insecticide and avoided sprayed surfaces. This, " the most compelling example of behaviouristic resistance to insecticides by mosquitoes ", was reinvestigated in 1958.

The sensitivity to DDT-impregnated paper of the two hyper-irritable strains (from Gatuncillo and Santa Rosa) was compared with that shown by an untreated field population from Rio Gatun, and the Gorgas Laboratory colony.

Engorged female *A. albimanus* were exposed singly to standard WHO DDT-impregnated paper (1%, 2% and 4%) held against a vertical surface under a hollow transparent plastic cone (WHO standard exposure chamber for wall bioassays). The time between their immediate settling and their subsequent taking flight was determined. An initial 3 minutes was allowed before a take-off was considered as an excitation time.

Although test conditions were standardized, there was great variation between individual flight excitation times. But the mean excitation times for the Rio Chagres populations of Gatuncillo and Santa Rosa were, respectively, significantly and almost significantly less than those from the untreated Rio Gatun population and the laboratory strain. There was no difference in susceptibility between the Gatuncillo, Rio Gatun and the laboratory strain when they were exposed to DDT deposits for one hour. *R. J. Wood*

TRYPANOSOMIASIS

*In this section abstracts are arranged as far as possible in the following order:—*African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

FOSTER, R. **The Establishment of the Tsetse Fly** *G. morsitans* **in an Alien Habitat.** *Bureau Permanent Interafricain de la Tsé-Tsé et de la Trypanosomiase No. 215/0,* Léopoldville (Congo Belge). C.P.R.U. Misc. Rep. No. 212. 1958, Oct., 4 mimeographed pp., 1 folding fig.

Puparia of *Glossina morsitans* were introduced into isolated blocks of woodland 20 miles south of Arusha, Tanganyika. The nearest locality for *G. morsitans* was about 70 miles to the south west. The woodland normally was inhabited by *G. swynnertoni.*

A preliminary introduction of 940 puparia produced a peak of abundance of young flies 14 days later, and a peak of old males one week after this. There was some increase in the catch of young flies in the sixth and seventh weeks after the introduction, and this was due possibly to delay in development of the puparia. In the eighth, ninth and tenth weeks after the first introduction, a further 5,680 puparia were brought into the area, which was then sprayed with BHC in the eleventh week. This reduced the population of old males by 98–99%, but a small population of *G. morsitans* was maintained in the area for 4 months after spraying. *B. R. Laurence*

DA SILVA, J. M. Subsídios para o estudo da *Glossina austeni* Newst. I—Contribuições para o conhecimento da comunidade glossínica da Ilha Nhazidima. I Parte. [**Studies on** *Glossina austeni.* **I. Observations on the Tsetse Flies of Nhazidima Island, Save River, Mozambique**] *Anais Inst. Med. Trop.* Lisbon. 1958, Sept., v. 15, No. 3, 679–97, 1 folding map. English summary.

ESTEVES DE SOUSA, A. de A. II Parte. *Ibid.*, 699–710, 1 text fig. & 15 figs. on 8 pls. English summary. [12 refs.]

FRIEDHEIM, E. A. H. **Some Approaches to the Development of Chemotherapeutic Compounds.** *Ann. Trop. Med. & Parasit.* 1959, Apr., v. 53, No. 1, 1–9.

This paper represents the subject-matter of a lecture delivered at the Liverpool School of Tropical Medicine in October 1958. If somewhat limited in outlook, it is amusing and up-to-date and makes enjoyable reading. The chemotherapy of African trypanosomiasis is the main theme. In spite of the development of the use of antimetabolites, largely by WOOLLEY, it must be admitted that a rational approach to chemotherapy has not yielded the dividends of "hit and miss" methods. The author's outlook appeals greatly to the abstracter. "The chief thing is to get started and to learn as you go."

Development of arsenical compounds for treatment of trypanosomiasis is briefly described from the historical aspect and is most interesting. The properties of a drug which determine its distribution and elimination receive mention and the author's application of these principles met with considerable success in a number of directions. It has proved particularly useful in those compounds in which organic arsenical derivatives are combined with BAL or in which melaminyl structures have been introduced, to the great benefit of those who suffer from African trypanosomiasis. The introduction of antimony dimercaptosuccinate appears to hold considerable promise for the treatment of schistosomiasis. *J. D. Fulton*

ASHCROFT, M. T. **The Effect of Cortisone on** *Trypanosoma rhodesiense* **Infections of Albino Rats.** *J. Infect. Dis.* 1959, Mar.–Apr., v. 104, No. 2, 130–37, 2 figs. [20 refs.]

This study was undertaken to obtain information on the effect of cortisone upon defence mechanisms of the host during infection with a relatively benign strain of *Trypanosoma rhodesiense*. For this purpose male rats were given blood intraperitoneally from similar hosts infected by *Glossina morsitans* which had fed on infected sheep. Cortisone in one experiment was injected subcutaneously each day starting on the day before infection, with doses of 25–50 mgm. per kgm. weight. Some non-infected rats and others infected but not treated served as controls. Other experiments were made on similar lines with variations in drug dosage, number of parasites inoculated and timing of drug administration. The course of infection was followed by counting parasites in tail blood.

Early during infection the parasite counts were higher in those animals receiving the largest dose of the drug. This dose exerted a toxic effect and caused death of some hosts. A different result was obtained when the dosage of drug was reduced in that treated animals had a lighter infection and survived longer; with still lower doses parasitaemia increased beyond that in controls and cortisone was believed to exert a protective effect against high parasitaemia.

The conflicting results obtained appear to depend on a number of factors which are far from clear. *J. D. Fulton*

SQUIRE, F. A. **Infectibility of Tsetse Flies,** *Glossina palpalis* (R.-D.) and *G. tachinoides* **Westw. with** *Trypanosoma vivax*. *Bull. Entom. Res.* 1959. Mar., v. 50, Pt. 1, 183–9.

" Observations were made at Dorimon in the extreme north-west of Ghana, during the hot months of March and April 1954, of the infectibility of *Glossina palpalis* (R.-D.) and *G. tachinoides* Westw. with *Trypanosoma vivax*.

" Pupae were obtained from the Black Volta where shade temperatures ranged from 70 to 98°F. and the flies that emerged from them were kept singly in small glass tubes in the laboratory at a temperature of 85 to 95°F. and a relative humidity of 60 to 80 per cent. They were given several feeds on infected goats. The following percentage rates of infection were observed.

" Labrum and (or) hypopharynx: General rate, 56·1; males of *G. palpalis*, 72·2, females, 34·6; males of *G. tachinoides*, 68·4, females, 56·8.

"Labrum only and labrum and hypopharynx: General rate, 37·4; males of *G. palpalis*, 27·8, females, 15·4; males of *G. tachinoides*, 68·4, females, 40·9.

"Early infection is the rule but late infections occurred. Some flies appear to be uninfectible. Thus, out of 107 flies, 47 remained uninfected in spite of having had on the average 10·6 infective meals per fly. A high percentage of flies lost their labrum infection.

"The following percentage loss of labrum infection was recorded: General rate, 48·8; males of *G. palpalis*, 66·7, females, 62·5; males of *G. tachinoides*, nil, females, 43·8.

"*G. tachinoides* appears to be more tenacious of infection than *G. palpalis*. Feeding infected flies on goats in the negative phase and (or) on spurwing goose (*Plectropterus gambensis*) did not appear to have any adverse effect on the colonies of trypanosomes in the labrum."

HOARE, C. A. **Morphological and Taxonomic Studies on Mammalian Trypanosomes. IX. Revision of** *Trypanosoma dimorphon*. *Parasitology*. 1959. May, v. 49, Nos. 1/2, 210–31, 5 figs. [Numerous refs.]

The author was fortunate enough to obtain from the Pasteur Institute, Paris, the original slides on which LAVERAN and MESNIL made their description of *Trypanosoma dimorphon* over 50 years ago: to his surprise many of the stained films were still in a perfect state of preservation.

The species is re-established on the strain isolated from a horse in the Gambia by DUTTON and TODD, and studied in rats, mice and goats by several workers at the beginning of the century.

The dimorphic character is now shown to be erroneous: the species is monomorphic, 16μ in mean length (14–18μ), with no free flagellum, with a rounded or pointed posterior end and with a fairly large subterminal and marginal kinetoplast. It is to be distinguished from *T. simiae* on morphological grounds and from *T. congolense* by its greater length (and virulence). *T. dimorphon* exists in the Gambia, Guinea, Ivory Coast, Belgian Congo, Sudan, Somalia, Southern Rhodesia, Portuguese East Africa, East Africa and Zululand; while GODFREY is studying at present a strain in Northern Nigeria from a dog which has characters intermediate between this species and *T. congolense*.

[See also this *Bulletin*, 1956, v. 53, 1321.] *P. C. C. Garnham*

UILENBERG, G. Een geval van *Trypanosoma congolense* infectie bij een kameel (*Camelus dromedarius*). [**A Case of** *Trypanosoma congolense* **Infection in the Camel**] *Tijdschr. v. Diergeneesk.* 1959, June 1, v. 84, No. 11, 610–11. English summary (1 line), 1 fig.

VON BRAND, T. & TOBIE, Eleanor J. **Observations on the Metabolism of the Culture Form of** *Trypanosoma congolense*. *J. Parasitology*. 1959, Apr., v. 45, No. 2, 204–8. [17 refs.]

"1. The oxygen consumption of the culture form of *Trypanosoma congolense* is sensitive to cyanide and sulfhydryl inhibitors. It is inhibited but slightly by Krebs cycle inhibitors.

"2. The RQ is 0·9. Anaerobically, no respiratory carbon dioxide is produced.

"3. The major aerobic organic metabolic endproducts are pyruvate and acetate. Smaller amounts of lactate, succinate, and glycerol are excreted also.

"4. Under anaerobic conditions, the main endproducts are pyruvate, acetate, and succinate. Small amounts of glycerol are produced also; lactic acid is produced at most in traces, if at all."

[See this *Bulletin*, 1955, v. 52, 347; 1956, v. 53, 978.]

GOBLE, F. C. & BOYD, J. L. **Action of Certain Tetrapyrrole Derivatives in Experimental** *Trypanosoma congolense* **Infections.** *Proc. Soc. Exper. Biol. & Med.* 1959, Apr., v. 100, No. 4, 745–50, 1 fig. [13 refs.]

"A number of tetrapyrrole derivatives of both plant and animal origin were tested for ability to influence the course of *Trypanosoma congolense* infections in mice. Of these, chlorophyllins, containing either magnesium or copper, and hematoporphyrin were effective in delaying deaths from trypanosomiasis and with prolonged administration cures could be effected. The non-metallic phaeophorbide relatives of chlorophyllin were ineffective as were deuteroporphyrin, mesoporphyrin, phylloporphyrin, pyrroporphyrin, rhodoporphyrin and uroporphyrin, as well as certain bile pigments. The antitrypanosomal effect of chlorophyllin and hematoporphyrin could be reversed, either completely or partially, by hemin, but not by protoporphyrin. The hypothesis that the mechanism of action of these tetrapyrrole derivatives in suppressing trypanosome infection involves competitive inhibition of a growth factor essential for the parasite (apparently hemin, rather than protoporphyrin) seems to be supported by our experiments. Other species of hemoflagellates and certain other parasites were uninfluenced by compounds active in *T. congolense* infections. It is conjectured that sensitivity of this particular parasite may be attributable to a certain combination of physiological attributes which is not possessed by its relatives."

SMITH, I. M. **Chemoprophylaxis against Bovine Trypanosomiasis. I. Duration of Protection from Prothidium, and Ethidium and R.D. 2902 Suraminates, in an Area of High Tsetse Density.** Reprinted from *J. Comp. Path. & Therap.* 1959, v. 69, No. 1, 105–15, 1 fig. [10 refs.]

ALWAR, V. S. **Experimental Transmission of** *Trypanosoma evansi* **in Poultry.** Reprinted from *Indian Vet. J.* 1958, Aug., v. 35, No. 8, 412–5. [18 refs.]

VON BRAND, T., MCMAHON, Patricia, TOBIE, Eleanor J., THOMPSON, M. J. & MOSETTIG, E. **Chemical Composition of the Culture Form of** *Trypanosoma cruzi*. *Exper. Parasit.* New York. 1959, Apr., v. 8, No. 2, 171–81, 5 figs. [24 refs.]

In order to obtain culture forms of *Trypanosoma cruzi* in quantity to study their chemical composition they were grown in a biphasic medium of blood

agar overlaid with Locke's solution which gave a good yield, or in dialysate cultures in which parasites were present free from extraneous matter but in relatively small numbers [this *Bulletin*, 1948, v. 45, 880]. The parasites were washed by centrifugation.

The inorganic, polysaccharide, fermentable carbohydrate, lipid and protein content of the two products are shown in a table. After extraction with ether the lipids present were fractionated as acetone soluble or insoluble portions. The first fraction was hydrolysed with KOH to give two fractions. The unsaponifiable fraction contained cholesterol. A polysaccharide fraction was obtained by saponification of parasite material with KOH followed by precipitation with ethanol. Absorption at 260 mμ indicated that nucleic acid derivatives were present and the bases adenine and thymine were recognized after hydrolyses with perchloric acid followed by chromatography. Galactose and ribose but not glucose were identified as products of hydrolysis of the polysaccharide by paper chromatographic methods.

The authors remark on the absence of glycogen or other glucose polysaccharides in the organism and lipids preponderate over carbohydrates.

J. D. Fulton

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

MANSON-BAHR, P. E. C. **East African Kala-Azar with special reference to the Pathology, Prophylaxis and Treatment.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Mar., v. 53, No. 2, 123–36, 4 figs. on 2 pls. [37 refs.] Discussion 136–7, with 3 further refs. [HOARE, C. A.; GARNHAM, P. C. C.; LEWIS, D. J.; BOYD, J.; MANSON-BAHR, P. E. C. (in reply)].

During 1957, 457 cases of kala azar were diagnosed in Kenya, of which 263 came from a single location (Tseikuru) with an incidence of one in 31 of the population.

Leishmaniomata were produced artificially by inoculating cultures of leptomonads into the skin of various people. Cultures derived from a human strain of *Leishmania donovani* gave rise to a chronic nodule (and 4 months later to a typical attack of the disease, with marked leucopenia, hyperglobulinaemia and a positive complement-fixation reaction), and cultures from a gerbil and ground squirrel strain gave rise to similar nodules which faded in 6 to 10 months and produced no visceral lesions.

The nodule in section shows a granulomatous reaction with increasing invasion of the macrophage cells by the organism; later epithelioid and giant cells appear. It is thought that many infections in East Africa are confined to the primary lesion in the skin; on the other hand if systemic invasion occurs every organ in the body may be attacked, most commonly the liver and spleen,

but the blood does not show parasites, although blood cultures were obtained in 7 out of 21 active cases. The skin itself was found parasitized in 11 out of 94 cases.

The question of immunity in kala azar is considered. Patients who had recovered from artificially produced skin lesions, or from treated natural infections, were found to be immune to further inoculations of animal or human strains of the parasites, though typical Arthus reactions occurred. Active immunization of the population could be used to protect a population by such a procedure.

Pentostam was found to be the most suitable drug in treatment; urea stibamine and hydroxystilbamidine alone or in combination with the first were also tried. *P. C. C. Garnham*

JENKINS, A. R., ROBERTSON, D. H. H. & MANSON-BAHR, P. E. C. **Serum Proteins in East African Kala-Azar.** *Ann. Trop. Med. & Parasit.* 1959, Apr., v. 53, No. 1, 93–6, 1 chart. [11 refs.]

The serum protein of 13 patients with East African kala azar and of one patient with post-kala-azar dermal leishmaniasis was examined by electrophoresis. The albumin fraction was universally low. The globulin fraction was high, and nearly all of the increase in this fraction was due to a rise in the gamma globulin. There was a definite relationship between spleen size and the level of gamma globulin. The formol-gel test was also related to that level and was negative in 4 of the patients where the gamma globulin amounted to less than 4 gm. per 100 ml. *H. Lehmann*

SHANKER, A. **Electrophoretic Differential Serum Protein Pattern in Kala-Azar.** *Brit. Med. J.* 1959, May 9, 1221–3. [23 refs.]

19 patients with kala azar were examined for changes in their serum protein. In each instance the diagnosis had been confirmed by finding Leishman-Donovan bodies on spleen or stermal puncture. Only 2 of the patients had initially a serum protein level below 7·4 gm./100 ml. All the others had a raised total serum protein although the albumin was well below normal. The albumin/globulin ratio was reversed in all instances. The globulin was high entirely because of an increase in the gamma globulin fraction. The $alpha_1$, $alpha_2$ and beta globulins were not increased.

BENHAMOU *et al.* [see this *Bulletin*, 1950, v. 47, 830] stated that they had seen in 2 kala azar patients a protein fraction "X" which moved more rapidly than albumin on electrophoresis at alkaline *p*H. The authors did not find this fraction in their series of investigations.

The aldehyde test was positive in 11 and Chopra's in 16. These tests were related to the hyperglobulinaemia.

With treatment the gamma globulin tended to return to normal. However, the serum protein pattern was not fully corrected when clinical cure had been achieved and when the serum protein lability tests gave normal results.

H. Lehmann

GARNHAM, P. C. C. & LEWIS, D. J. **Parasites of British Honduras with special reference to Leishmaniasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Jan., v. 53, No. 1, 12–35, 19 figs. (6 on 2 pls.) [Numerous refs.] Discussion 36–40 [HOARE, C. A.; WOODRUFF, A. W.; SHORTT, H. E.; FULTON, J. D.; BERMÚDEZ M., A.; CHESTERMAN, C. C.; FREEMAN, P.; BOYD, J.; GARNHAM, P. C. C. (in reply); LEWIS, D. J. (in reply)].

The authors record the parasitological observations made during their 6 weeks' sojourn in British Honduras, the main object of which was to study the local form of cutaneous leishmaniasis known as chiclero's ulcer or "bay sore", which also occurs in other parts of Central America. This disease is prevalent in the forest and affects chiefly people who spend long periods there during the rainy season, especially the chicleros who collect the latex of sapodilla trees from which chewing-gum is prepared.

Among the 50 cases of infection studied, the ear was the chief site of the lesion. In the early stages (up to 4 months) there is a small scab or pimple covering a granuloma from which leishmaniae can be recovered. In older cases—which may last over 30 years—there is much erosion of the outer ear with granulomatous sores, in which parasites cannot be detected. Diagnosis is made by the typical appearance of a painless lesion and with the aid of the Montenegro skin test. The parasite is readily cultivated and is infective to mice and hamsters, in which it produces cutaneous or visceral infection, according to the method of inoculation (subcutaneous or intrasplenic). In hamsters the Leishman-Donovan bodies were frequently devoid of a kinetoplast and showed other abnormalities. In discussing the identity of the parasite, the authors regard it as a nosodeme (biological variant) of *Leishmania braziliensis*.

From the epidemiology of this disease it would appear to be a zoonosis, as in the case of cutaneous leishmaniasis in Panama, where the spiny rat (*Proechimys*) was incriminated as the reservoir host. However, examinations of local dogs, rodents, a fox, opossums and armadillos failed to reveal any infection. In attempts to find the vectors of chiclero's ulcer, 14 local species of sandflies were studied, but no leptomonads were found in them. These species of *Phlebotomus* and their biology are discussed at length.

Among control measures the authors recommend immunization with attenuated cultures of *Leishmania*, but in view of the extremely chronic course of the disease and presumably low antigenicity of the parasite, they think that *L. tropica* might be more suitable for the purpose.

The authors found 13 species of *Simulium*, including 2 (*S. quadrivittatum* and *S. metallicum*) that attack man. Although human onchocerciasis is absent in British Honduras, there is a danger that it might be introduced there from Guatemala.

A brief account is also given of miscellaneous endo- and ecto-parasites (fungi, protozoa, nematodes, insects etc.) found by the authors.

In the discussion that followed, C. A. Hoare suggested that cutaneous leishmaniasis throughout the world is caused by *L. tropica*, which is subdivided into biological races, some of which (*e.g.* in the New World) might be distinct subspecies and others (*e.g.* in the Old World) nosodemes. A. W. Woodruff referred to a case of latent kala azar which became overt after the patient had been in England for 9 years. As gamma globulin was practically absent

in his serum, it is possible that this might have influenced the proliferation of the parasites. H. E. Shortt wondered whether, in the case of chiclero's ulcer, the vector might be a sandfly living in the forest canopy. The same idea was put forth by Sir John Boyd, who recalled the role played by the tree-dwelling *Haemagogus* in the transmission of jungle yellow fever. Other speakers included A. Bermúdez M., J. D. Fulton, C. C. Chesterman and P. Freeman. *C. A. Hoare*

CORRÊA, M. O. A. & AMATO NETO, V. Intradermorreações com antígeno de culturas de *Leishmania braziliensis* submetidas à ação do ultra-sŏm: resultados obtidos. [**Intradermal Tests with Antigen from Cultures of *Leishmania braziliensis* subjected to Ultrasonic Waves**] *Rev. Inst. Adolfo Lutz.* S. Paulo. 1957, v. 17, 39–42. English summary.

The authors describe a method of preparing antigen for the intradermal test in American cutaneous leishmaniasis. For this purpose, cultures of *Leishmania braziliensis* are washed in saline, and suspensions containing 2 million leptomonads per cc. are exposed for 20 minutes to the action of ultrasonic waves with a frequency of 800 kilocycles. The intradermal test performed with this antigen was positive in 18 patients with cutaneous leishmaniasis, whereas in 11 out of 12 persons—suffering from other diseases or normal—the results were negative. The antigen retained its activity after 2 years. *C. A. Hoare*

CONVIT, J. Leishmaniasis Tegumentaria Difusa. Nueva entidad clínico patológica y parasitaria. [**Leishmaniasis Tegumentaria Diffusa: a New Nosological Entity**] *Rev. Sanidad y Asistencia Social.* Caracas. 1958, Jan.–Apr., v. 23, Nos. 1/2, 1–28, 53 figs. on 28 pls. (4 folding). [10 refs.] English summary.

An account is given of a new form of cutaneous leishmaniasis occurring in Venezuela, where 11 cases were recorded since 1948 [this *Bulletin*, 1950, v. 47, 611]. In the present paper the author describes the course of the disease, the lesions, their histopathology, immunology and parasitological findings, based on a study of 6 patients, 3 of whom had been under observation for more than 10 years.

The initial lesion usually appears in the form of an erythematous nodule, which gradually reaches 2–3 cm. in diameter. After some months small satellite nodules are formed around it, eventually fusing to form a plaque. In the course of a number of years the infection gradually spreads all over the surface of the body, which becomes covered with numerous nodules and plaques resembling those found in lepromatous leprosy. Since new lesions appear along the vascular lines, it is thought that the infection spreads through the blood vessels. In fact, on 2 occasions parasites were seen in blood obtained by venipuncture. Neither the oropharyngeal region nor the viscera are affected by this infection, which is restricted to the skin.

Histopathologically the disease is characterized by granulomata consisting of macrophages packed with Leishman-Donovan bodies, which differ from *Leishmania braziliensis* in their larger size (means 5 μ, maximum 7 μ). It was also

shown that the parasite responsible for the new disease was immunologically distinct from *L. braziliensis*, for a patient infected with the latter was found to be resistant to superinfection with the homologous strain but was infected with the heterologous strain. Moreover, in cases of diffuse leishmaniasis the Montenegro reaction was negative. From these data the author concludes that the new disease is caused by a distinct species of *Leishmania*. The parasite was grown in cultures on Davis medium, and, when inoculated into mice, hamsters, squirrels and man, produced typical cutaneous lesions.

Early cases of the disease—both in man and experimental animals—were cured with Solustibosan, but advanced cases did not respond to treatment with this or other drugs (antimonials, arsenicals and antibiotics).

The paper is illustrated by numerous excellent photographs depicting cases in various stages of the disease, and by photomicrographs of sections of the lesions. 6 case histories are given. *C. A. Hoare*

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

SHATROV, I. I. **Problems of the Epidemiology of Typhus in its Present Form.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, No. 8, 1294–9, 1 fig. [13 refs.] [Translated from Russian.]

Complete elimination of typhus is now under consideration in Russia and it is therefore important to decide where the rickettsia survives in inter-epidemic periods. The most popular theory assumes the recovered patient to be a life-long carrier subject to relapses caused by precipitating factors.

The author of this paper does not believe in the persistence of infection or in relapses. He points out that years of social upheaval are characterized by high mortality in typhus and other diseases. Typhus is now mild and the incidence low, and typhus patients carry few infected lice.

If rodents are not the reservoir of infection, and human carriers do not exist, where does the organism persist between sporadic cases? The author believes that the continuity of infection is maintained by unrecognized infections treated under other diagnoses. *T. H. Davey*

GOLDWASSER, R. A. & SHEPARD, C. C. **Fluorescent Antibody Methods in the Differentiation of Murine and Epidemic Typhus Sera; Specificity Changes resulting from Previous Immunization.** *J. Immunology.* 1959, Apr., v. 82, No. 4, 373–80. [18 refs.]

Cross-reactions with both *Rickettsia prowazeki* and *R. mooseri* caused difficulty in distinguishing between epidemic and murine typhus infections when sera were tested by means of indirect fluorescent antibody staining techniques. It was found that cross-reacting antibody could readily be absorbed by diluting

sera in preparations of the soluble antigens of the 2 types of rickettsia, sharp differences in titre being demonstrable by this means. Sera diluted with heterologous antigen lost most of their ability to bring about staining of heterologous rickettsiae while retaining most of their titre for homologous organisms; when diluted with homologous antigen, ability to react with both types of rickettsia was markedly reduced. This simple procedure for absorbing cross-reacting antibody has proved convenient in the investigation of virus and rickettsial diseases.

Antibodies formed during murine typhus infections in 2 persons who had previously received epidemic typhus vaccine were mainly directed against *R. prowazeki*. This indication that the response to rickettsial infection was influenced by previous exposure to another member of the group was supported by guineapig experiments; vaccinated animals challenged with a heterologous strain formed antibody which was specific for the vaccine strain, except when the dose of heterologous organisms was relatively high (4×10^3 egg LD50 or more).

[This interesting and useful paper should be consulted for details of procedure.] *R. S. F. Hennessey*

NICE, P. O. & BEEKEN, W. L. **A Case Report of a New Serological Pattern in the Rickettsial Group.** *Amer. J. Med. Sci.* 1959, Apr., v. 237, No. 4, 474–8. [14 refs.]

In December 1955 an adult female residing in Connecticut developed a feverish illness with headache, stiffness of the neck, shoulders and back, and a mild sore throat; a macular rash was present on the arms and trunk from the 7th to the 11th day. The total leucocyte count on the 7th day was 6,950 cells per cmm. Serum taken on the 8th day agglutinated *Salmonella typhi* O antigen at a dilution of 1 in 40; on the 12th day, the patient's serum agglutinated *S. typhi* H and O antigens at a titre of 1 in 80, *S. paratyphi* B at 1 in 40, and *Proteus OX19* at 1 in 320. The serum had a complement-fixing titre of 1 in 320 against *Rickettsia prowazeki* soluble antigen on the 12th day, rising to 1 in 1,280 on the 26th day. The titre against *R. burneti* antigen rose from zero on the 8th day to 1 in 320 by the 19th day. The patient was treated with tetracycline and made an uneventful recovery.

Sera from 2 dogs in the patient's household were tested 8 months after her illness; they both gave positive complement-fixation reactions with *R. prowazeki* and *R. burneti* antigens, one at a dilution of 1 in 5 and the other at 1 in 20. The patient had been "delousing" [*sic*] her dogs one week before the onset of her illness, and may have contracted a rickettsial infection from them. "It is suggested that this may be a previously unrecognized rickettsial disease in which the causative organism shares antigens with the agents of both Q fever and typhus." *R. S. F. Hennessey*

HARRISON, J. L. **Range of Movement of some Malayan Rats.** Reprinted from *J. Mammalogy*. 1958, May, v. 39, No. 2, 190–206, 9 figs. [14 refs.]

"In connection with work on the vector of mite-typhus, estimates of the range of movement have been made of the following Malayan rats; *Rattus*

jalorensis, R. argentiventer, R. exulans, R. mülleri, R. sabanus, R. rajah (including *pellax* and *surifer*) and *R. whiteheadi.*

"Rats were trapped, marked by toe-clipping, released and retrapped in a number of sample areas. Each area was marked out, usually in a grid at 20-meter intervals, and traps were placed at different points in rotation. In this way it was hoped to sample the actual trapping rate of individual rats at that point, unaffected by intervening traps.

"The results have been expressed by assembling, for each rat, the number of trappings within circles of successively smaller diameters, and plotting these numbers against the diameter. The empirical curve obtained approximates the cumulative frequency curve derived from a normal distribution, and by transforming coordinates from frequencies to normal deviates a straight-line relationship is obtained.

"The best estimate of this distribution is considered to be the *standard diameter* obtained from the graph where the line cuts the abscissa for unit deviation, equal to twice the root mean square of all distances from the center of the range. The rat would be expected to spend about 68 per cent of its time within a circle of this diameter and effectively all of its time within a circle of 3½ times this diameter.

"Some experiments on the homing ability of *Rattus jalorensis* are described. Rats released at varying distances up to 1,500 meters found their way home with successively reduced frequency. It is considered that this result is fully explicable by random searchings on the part of the released rat."

SHISHIDO, A., OHTAWARA, M., TATENO, S., MIZUNO, S., OGURA, M. & KITAOKA, M. **The Nature of Immunity against Scrub Typhus in Mice. I. The Resistance of Mice, Surviving Subcutaneous Infection of Scrub Typhus** *Rickettsia,* **to Intraperitoneal Reinfection of the Same Agent.** *Japanese J. Med. Sci. & Biol.* 1958, Oct., v. 11, No. 5, 383–99, 4 figs. [25 refs.]

Mice inoculated subcutaneously with *Rickettsia orientalis* and re-infected by the intraperitoneal route at 21 days showed no significant change in the infective titres of the spleen and liver. Rickettsiae were detected in these organs for at least 42 days after a primary infection, the titre of neutralizing antibody in the serum increasing over this period. Infection with *R. orientalis* rendered mice significantly resistant to infection with *R. typhi* [*R. mooseri*] and meningopneumonitis virus; this is interpreted as an interference effect.

R. S. F. Hennessey

PIONTKOVSKAIA, S. P. & MISCHENKO, N. K. [**Ecology of** *Dermacentor nuttalli* **Olen. and of some other Ectoparasites of Rodents in a Natural Reservoir of Tick-Borne Typhus Fever in the Tuva Autonomous Region**] *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 2, 164–70. [12 refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"Within the steppe belt the carrier tick, D. nuttalli was found in May–June 1957 on dead standing plants, cattle (adults) and on small animals (larvae, nymphae).

"Examination of 706 animals caught in the reservoir and belonging to 6 species (Citellus undulatus, Cricetulus barabenbis, Allactaga sibrica, Meriones meridianus, Pallastiomys unguiculatus, Microtus oeconomus), revealed, that the first two (most numerous) are hosts of immature stages of the carrier. Larvae appeared on them in the middle of June, and nymphae—at the end of the month.

"Of 10 flea species found on Citellus predominant was Ceratophyllus tesquorum altaicus, whose females on many occasions would stick to persons engaged in examining the animals. Of 7 flea species found on Cricatulus prevalent were Neopsylla bidentatiformis, Amphypsylla vinogradovi and Frontopsylla elatoides.

"Gamasoidea were encountered on the animals irregularly, Hirstionyssus criceti was dominant on Citellus, and H. criceti and H. transiliensis—on hamsters. Leeuwenhoekia major (Trombiculinae) was of rare occurrence on hamsters.

"Of interest is the finding of D. nuttalli larvae on Ochotona daurica and Allactaga sibirica, in some areas of bush-covered steppe land of the Ubsunur hollow, at 100 m above sea level.

"From D. nuttalli collected on C. undulatus O. S. Korshunova isolated a strain of Rickettsia sibirica.

"To reduce the numbers of the carrier and to safeguard man against attacks of D. nuttalli the authors propose: to burn dead standing plants in early spring, to organize intensive Citellus hunting in the steppe, to apply DDT to cattle, to effect obligatory periodical inspection of the clothing and the body of persons working in the steppe."

ZARNEA, G., ALEXANDRESCU, N., SZÉGLI, Lucia, VOICULESCU, R., DINCULESCU, M., IONESCU, Honorina & PEREDERI, S. Prezenţa *C. burneti* la ariciul *Erinaceus europaeus* (Linné) capturat într-un focar endemo-enzootic de febra Q. **[The Occurrence of *Rickettsia burneti* in a Hedgehog (*Erinaceus europaeus* (Linné)) captured in an Endemo-Enzootic Focus of Q Fever]** *Microbiol., Parazitol., Epidemiol.* Bucharest. 1959, Mar.–Apr., v. 4, No. 2, 147–8.

HOEPRICH, P. D., WARD, J. R. & SCHMIDT, A. M. **Report of a Serologically Proved Case of Q Fever in Utah.** *J. Amer. Med. Ass.* 1959, May 9, v. 170, No. 2, 180–83, 2 figs. [13 refs.]

"A case of serologically proved Q fever occurred in a young man who works in a plant processing sheep hides. Although this is the second proved case of Q fever in Utah, serologic evidence indicates Q fever is of both widespread and frequent occurrence in the state."

DERRICK, E. H. **A Review of Californian Investigations into the Relation of Human to Ovine "Q" Fever.** *Med. J. Australia.* 1959, May 2, v. 1, No. 18, 591–4, 1 fig. [21 refs.]

TONGE, J. I. & DERRICK, E. H. **A Fatal Case of "Q" Fever associated with Hepatic Necrosis.** *Med. J. Australia.* 1959, May 2, v. 1, No. 18, 594–7.

"A meatworker, aged 52 years, developed an acute attack of 'Q' fever. Enlargement of the liver appeared on the twelfth day, and jaundice on the fourteenth. He died on the seventeenth day. Autopsy showed very extensive necrosis of the liver. It is uncertain to what extent this was due to *C. burneti.* There were also acute inflammatory lesions in the lung, brain and kidney."

[See also this *Bulletin*, 1957, v. 54, 24.]

DENGUE AND ALLIED FEVERS

BURGDORFER, W. & EKLUND, C. M. **Studies on the Ecology of Colorado Tick Fever Virus in Western Montana.** *Amer. J. Hyg.* 1959, Mar., v. 69, No. 2, 127–37, 1 fig.

5 areas of 10–30 acres were studied: 3 populated mainly by Columbian ground squirrels (*Citellus columbianus columbianus*) and chipmunks (*Eutamias amoenus*); 2 populated mainly by golden-mantled ground squirrels (*C. lateralis tescorum*), deer mice (*Peromyscus maniculatus*), and chipmunks. Ticks were collected from trapped animals and from vegetation. Virus isolations were attempted from the blood of trapped animals and from ticks. The maximum activity of *Dermacentor andersoni* was in May and June. The golden-mantled squirrels were generally more heavily infested with ticks than the other species.

The incidence of virus infection in the ticks from the 5 areas varied from 0 to 16% being 11·5 and 16·1% in the two areas populated mainly by golden-mantled squirrels. Virus was isolated from 13% of the Columbian ground squirrels trapped between May and August: in 4 areas 8% to 27% of them were infected, though no infected animals were found in 42 from the area with the largest population of Columbian ground squirrels but no golden-mantled squirrels. No virus was isolated from the ticks off 70 uninfected and 6 infected Columbian ground squirrels but isolations were made from ticks off 9 infected animals. Circulating virus was detected in 46% of the golden-mantled squirrels trapped between June and September. Virus was isolated 13 times from ticks off viraemic animals and from ticks off 6 animals from which virus was not isolated.

Virus isolations from chipmunks were successful (23%) only in animals from one of the areas populated by golden-mantled squirrels. Virus was also isolated from deer mice and pine squirrels (*Tamiasciurus hudsonicus richardsoni*).

The golden-mantled ground squirrel appears to be the preferred host of *D. andersoni* and the principal maintaining host of Colorado tick fever virus in this region, and the other animals from which virus was isolated are probably of secondary importance.

C. E. Gordon Smith

ROZEBOOM, L. E. & BURGDORFER, W. **Development of Colorado Tick Fever Virus in the Rocky Mountain Wood Tick,** *Dermacentor andersoni. Amer. J. Hyg.* 1959, Mar., v. 69, No. 2, 138–45, 1 fig.

2 very low-passage and 1 high-passage strains of virus were used. With the former, hamsters were found to circulate $10^{3.8}$ to $10^{5.6}$ LD50 of virus per ml. of blood from the second to the fifth day after inoculation. With the high-passage strain higher blood levels were attained and a high proportion of the hamsters died by the fifth day.

Nymphs of *Dermacentor andersoni* fed on viraemic hamsters showed either a slight decrease or no change in virus content during the quiescent phase of the tick but by the time they had become adult ticks an increase of 1·5 to 3·7 log. in virus had occurred. No difference was found in the behaviour of the virus in male and female ticks. Infected ticks had about the same virus content one year after infection.

Larvae infected with relatively small doses of virus showed an increase in virus content after metamorphosis to nymphs, but such increases could not be detected in nymphs infected with large doses of virus. The virus persisted at titres of 10^{-4} to $10^{-6.8}$ through the stages of tick development from larvae to adult. *C. E. Gordon Smith*

GERLOFF, R. K. & EKLUND, C. M. **A Tissue Culture Neutralization Test for Colorado Tick Fever Antibody and Use of the Test for Serologic Surveys.** *J. Infect. Dis.* 1959, Mar.–Apr., v. 104, No. 2, 174–83, 1 fig. [12 refs.]

Strain KB cells grown in slanted tubes were used. Serum-virus mixtures were incubated and then the cells added and the tubes incubated. Serum controls were necessary because some were cytotoxic. The results were read microscopically but the same results could be obtained by colour reading of the *p*H on the fifth day when the medium had been changed on the third day.

505 sera were tested in tissue culture and in mice by the intracerebral route and almost complete agreement was obtained. Serum specimens from proved cases of Colorado tick fever were also tested in parallel to determine the time of appearance of antibody by the two methods. Essentially similar results were obtained showing that neutralizing antibody does not appear before the seventh day of the disease.

A collection of sera known to contain antibody to a variety of unrelated agents were tested and positives were found only where they could be accounted for by the probable occurrence of Colorado tick fever infections.

A serum survey was carried out on groups of 47–178 sera: 32% of a group from western U.S.A. (mainly sheep shearers) were positive, as were 6% of a group of 47 mammalogists mainly from western U.S.A. There were 5% positives in a group of 116 adults and children from Idaho but all the 153 sera from Alaska and Turkey were negative. *C. E. Gordon Smith*

RABIES

McCHESNEY, T. C. & LEE JUNG JAI. **Prevention and Control of Rabies in Korea.** *U.S. Armed Forces Med. J.* 1959, May, v. 10, No. 5, 574–7.

Rabies came to be recognized officially as a disease of public health significance in Korea by the Korean Government in 1930. A table compiled by a department of the Ministry of Agriculture in Korea gives statistics of the dog population which show that the number of dogs is increasing very rapidly without a corresponding increase in the number of animals vaccinated since mass inoculation was introduced in 1958. In 1954, the dog population was recorded as 238,539 of which 142,258 were vaccinated, whereas in 1958 the number had risen to 455,379 with 223,531 vaccinations. During the intervening years many fewer animals were vaccinated. The number of dogs known to be rabid was 77 in 1954 and in the first 4 months of 1958 it was 38. Registration, licensing and leashing of animals are not required hence an increase in the incidence of rabies is to be expected. It is unofficially reported by the Chief of the Preventive Medicine Section of the Ministry of Health, Seoul, that in 1957 at least 5 persons died of rabies and over 9,000 persons received the anti-rabies treatment. During the period May 1957 to May 1958, 19 military personnel were bitten by infected animals and all "the victims received phenolized rabies vaccine without incident".

There is some description of the civilian and military control efforts but "it has become increasingly apparent that the Korean Government must institute an effective rabies control program to eliminate the threat to military personnel". The steps which have been taken to facilitate such a programme are set out in some detail and consist mainly in closer collaboration between the Livestock Bureau of the Korean Ministry of Agriculture and the veterinarians of the U.S. Eighth Army and the Office of the Economic Coordinator. It was also agreed that the Preventive Medicine Section of the Ministry of Health would be informed when the military authorities had knowledge that civilians were bitten or exposed to a rabid animal.

The protective measure given in the Eighth Army Circular, No. 40–940, "Prevention and Control of Rabies", dated 5 March 1958, are set out.

M. E. Delafield

FAILLACE DE LEON, R. La campaña antirrábica en Guatemala. [**Rabies Control in Guatemala**] *Bol. Oficina Sanitaria Panamericana.* 1959, Apr., v. 46, No. 4, 356–60.

In 1956, in the 22 departments of Guatemala 1,555 persons were bitten by 1,183 rabid dogs. Deaths from rabies notified each year from 1948 to 1955 varied between 5 and 10.

The programme of control is set out in detail; it follows orthodox lines and includes notification of cases, control of rabid animals and of dogs which may have been in contact with them, rounding up of stray dogs, destruction of animals suspected of or having rabies, surveillance of suspected dogs for 10 to 15 days, quarantine of imported animals and vaccination of dogs.

In 1956, 1,157 persons attended for vaccination. In the same year, 30,203 dogs were vaccinated.

H. J. O'D. Burke-Gaffney

VELASCO F., O. Control de rabia en El Callao, Perú, durante 1952 a 1957. **[Control of Rabies in Callao, Peru, between 1952 and 1957]** *Bol. Oficina Sanitaria Panamericana.* 1959, Mar., v. 46, No. 3, 222–6, 1 fig.

Callao is the principal port of Peru and has a population, largely urban, of 143,800 persons. In 1951 the public health services were reorganized on a unified basis and among other results of this step systematic control of rabies was introduced for the first time.

In 1952, 4 human deaths from rabies were reported and 30 cases of rabies in animals (29 dogs and a cat). Some 7,000 dogs were destroyed that year, as vaccination was not then organized. In 1953, one more human case occurred and 7 in animals, followed in successive years by 2, 1, 0, 3 in animals and none in man. Between 1953 and 1954, some 16,000 dogs were vaccinated and in 1956–1957, about 2,500 were vaccinated and 4,000 destroyed. Although the number of cases of rabies in dogs decreased over the years, there was an increase in the number of notifications of bitten persons from 842 in 1953 to 1,289 in 1957. This is shown in a table: other tables show the number of bites according to age, sex and site and the number of people vaccinated, which fell from 185 in 1952 to 85 in 1957.

The means of control are outlined, and these follow orthodox lines. Details are given of the various functions in the control of rabies exercised by doctors, veterinarians, health staff, administrators and others: it is stated that these various duties have been set out in a handbook. *H. J. O'D. Burke-Gaffney*

CONSTANTINESCU, N. & BÎRZU, N. Procesul de autosterilizare în turbare. **[The Process of Autosterilization in Rabies]** *Studii si Cercetări Inframicrobiol., Microbiol. si Parazitol.* 1957, v. 8, No. 4, 517–26, 4 figs. [11 refs.] French summary.

Groups of mice were vaccinated with 3 types of rabies vaccine and subjected to intracerebral challenge with decimal dilutions of the Babes strain of fixed rabies virus. Some immunized animals developed signs of infection after challenge, but survived with residual paralysis of varying extent. Titrations of the brains of such mice gave titres varying from the usual maximum titre down to zero, and provided quantitative evidence of the course of the process of autosterilization. *D. J. Bauer*

i. MATEWA, Vera. Titrierung von Phenol-Tollwutimpfstoffen nach den Methoden von Habel und Krause. **[A Comparative Study on the Titration of Phenol Type Rabies Vaccines, according to the Methods of Habel and Krause]** *Zent. f. Bakt.* I. Abt. Orig. 1959, v. 175, Nos. 1/2, 55–8, 1 fig.

ii. ————. Titrierung des mit dem Stamm Flury hergestellten Tollwutimpfstoffen. **[Titration of Rabies Vaccines prepared with the Flury Strain]** *Ibid.* 59–62.

i. "The titration of rabies vaccines of the phenol type according to the method of Habel shows considerable differences in its results, which is astonishing considering the identical procedure of their production.

"The titration of the same vaccines according to the method of Krause does not show such great differences in its results and permits a more reliable differentiation between good and poor vaccines."

[See this *Bulletin*, 1957, v. 54, 950.]

ii. "The Flury strain rabies vaccine may be titrated according to the plantar method of Krause with the same consistency of the phenol type vaccine."

ORLOVA, N. N. **A Study of Dried Formolized Rabies Vaccine adsorbed on Calcium Phosphate.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, Nos. 1/2, 194–9, 1 fig. [Translated from Russian.]

This articles compares the immunogenic activity of dried formolized vaccine adsorbed on calcium phosphate with that of two types (liquid and dried) of Fermi-type phenolized vaccine at various periods after their manufacture from the same strain of fixed rabies virus adapted to sheep. The procedure adopted for drying and storing the 5% sheep-brain vaccine prepared with 1% formalin solution is detailed in the text. 250 ml. haemotogen flasks, each containing 50 ml. (the equivalent of 10 doses) of the vaccine, were placed in a Dolinov system vacuum chamber and, on completion of the drying process, filled with sterile nitrogen. The flasks were then removed from the system, quickly closed with rubber stoppers, sealed with Mendeleev putty and stored in an ordinary refrigerator. Observations made during an 18-month period showed that the presence of nitrogen during storage of the vaccine was almost invariably demonstrable and that the initial moisture content of the preparations remained unchanged throughout.

The immunogenic properties of the various preparations under test were studied in white mice. The animals were vaccinated intraperitoneally 3 times, at intervals of 24 hours, with vaccine diluted 1 in 5 and 1 in 125, groups of 20–25 mice being immunized with each dilution. 12–15 days after the third dose of vaccine the resistance of the vaccinated animals was challenged by a single injection into the thigh muscles of a quantity of street rabies virus representing 4 MLD. Thereafter observation was continued for 20 days, the animals dying of rabies being counted from the 7th post-infection day.

In these experiments the vaccines used were repeatedly tested over a period of 1 year and 5 months from the time of their manufacture. From the tabulated results of 2 experiments it is evident that both dried formolized vaccine stored under nitrogen and dried phenolized Fermi-type vaccine stored *in vacuo* produced a marked immunity of white mice to street virus. Both vaccines evoked an equal degree of resistance when used in the dilution of 1 in 5 (80–95% survival among the vaccinated animals, compared with 16–20% among the controls). In the higher dilution, however, the phenolized vaccine, with only 60–68% of the animals surviving challenge, proved to be less effective than the formalized preparation, with 80–95% survival. Moreover the very high immunogenic property of dried formolized vaccine adsorbed on calcium phosphate and stored in large volume under nitrogen was found to remain undiminished over a period of 3 years and 6 months after the date of manufacture of that vaccine, whereas the activity of liquid phenolized vaccine decreased after 6 months. *G. Stuart*

NICOLAU, S. S., DRĂGĂNESCU, N., NICOLAU, C. & IONESCU, N. I. Cercetări asupra unui nou tip de vaccin antirabic obţinut sub acţiunea ionilor de argint. [**Investigation of a New Type of Antirabic Vaccine obtained with the Use of Silver Ions**] *Studii si Cercetări Inframicrobiol., Microbiol. si Parazitol.* 1958, v. 9, No. 3, 315–22. [17 refs.] French summary.

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

WORLD HEALTH ORGANIZATION. TECHNICAL REPORT SER. NO. 165. **Expert Committee on Plague. Third Report, Geneva, 15–20 September 1958.** 42 pp. [Refs. in footnotes.] 1959. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [1s. 9d.; $0.30; Sw.fr.1.–.]

This report comments on the reservoir hosts and vectors of wild-rodent plague in foci throughout the world. The discovery of wild-rodent plague in Kenya has altered views about the epidemiology of the disease in Central Africa where domestic rodents were thought to be the primary reservoir. Evidence from various areas suggests that rodents resistant to plague form the permanent reservoir of infection and maintain infected fleas during inter-epizootic periods. Persistance of plague depends on the ecological interplay between susceptible and resistant rodents in contact. In the Western United States small wild rodents, *Microtus* and *Peromyscus*, have been found resistant to plague and are probably a more important reservoir than the ground squirrel. Plague-infected fleas have been shown to survive a year's starvation.

Sulphonamides, sulphamerazine especially, if given early are satisfactory in the treatment of bubonic and even pneumonic plague. Streptomycin is apt to produce resistance in *Pasteurella pestis*; tetracyclines are as efficacious, and in the Soviet Union mycerin and bacteriomycin have been found satisfactory in all forms of plague.

A successful attempt has been made to eradicate plague in one area of the Soviet Union and in other areas to forestall or suppress epizootics. Gassing was the control method used originally, but recently grain treated with zinc phosphide has been spread by aircraft. Control of plague vectors by patch dusting with DDT or the use of insecticide-bait-boxes is promising; insecticide resistance has not been noted in known vector fleas. Suitable vaccines, alive or killed, can diminish community susceptibility to infection and if repeated annually will reduce plague incidence to a very low level.

Among numerous other matters briefly referred to, it is reported that in the Soviet Union all plague contacts are treated prophylactically with streptomycin 1 gm. daily for 5 days.

A number of subjects requiring research are listed. There are 6 annexes, including a list of plague-carrying rodents and Lagomorpha, a list of vector fleas, a brief comment on control by poisoning, and on controlling plague vectors, a note on insecticide resistance in fleas, and a description of organization and techniques for surveys on wild-rodent plague. *T. H. Davey*

EISLER, D. M., KUBIK, G. & PRESTON, H. **Dissociation in *Pasteurella pestis*: [i] Immunological Comparisons of Smooth and Nonsmooth Variants.** *J. Bacteriology.* 1958, Dec., v. 76, No. 6, 589–96, 24 figs. on 2 pls. [23 refs.] **[ii] Interrelations of Smooth and Nonsmooth Variants.** *Ibid.*, 597–606, 4 figs. [24 refs.]

i. Groups of mice were immunized against *Pasteurella pestis* by subcutaneous infection of avirulent strains. When the immunizing properties of morphological variants of several strains were compared it was found that smooth gave more protection than non-smooth variants against virulent strains, either smooth or non-smooth. The smooth variants were completely stable on subculture but the non-smooth showed some reversion to smooth. It is therefore suggested that immunity in animals which received non-smooth avirulent organisms was in part due to the presence of smooth variants.

The smooth and non-smooth variants of a virulent and an avirulent strain were compared serologically by means of Ouchterlony plates; antigens were suspensions of live cells and specific antisera were obtained from immunized rabbits. Qualitative differences were found not only between the two strains but also between the smooth and non-smooth variants of each strain.

ii. The variants of a predominantly smooth strain of *Pasteurella pestis* (Poona) were passaged several times in broth and it was found that the generation time of the non-smooth variants became longer and that of the smooth shorter. In order to determine whether the predominance of the smooth variant in a strain could be ascribed to shorter generation time, the parent smooth and non-smooth variants of strain 139L were compared. In each case the generation time was the same.

Serological examinations with the gel diffusion technique demonstrated differences in the antigenic structure not only between smooth and non-smooth but also between variants of similar colonial morphology.

Unsuccessful attempts were made to control smooth <—> non-smooth dissociation by growing one variant in the presence of extracts derived from the other; specific antisera combined with deoxyribonucleic acid from either variant were also without effect.

Non-smooth —> smooth dissociation was enhanced by culture of non-smooth variants in broth containing D(−) ribose and D(+) xylose and more slowly with deoxyribose. Prolonged incubation in the presence of commercial deoxyribonucleic acid also seemed to be responsible for the emergence of smooth variants. *Douglas D. Smith*

KALABUKHOV, N. I. **Characteristics of Heat Regulation in Rodents as One of the Factors in their Sensitivity to Plague Infection.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, No. 9, 1453–60, 3 figs. [36 refs.] [Translated from Russian.]

This paper describes experiments which indicated that the susceptibility of gerbils to infection with *Pasteurella pestis* was affected by seasonal changes in heat regulation, animals with higher rates of oxygen consumption on cooling to 10°C. surviving longer than those with lower rates. This correlation was most marked in gerbils infected in winter. Similarly, the optimal temperature

index (derived from the degree of heat preferred by the animals) was higher in gerbils which were more susceptible to infection than in those which were less susceptible. Other experiments showed that phagocytosis of plague bacilli was greater in jerboas kept at 10°C. than in those kept at 25°C.

These results are taken as evidence that "local immunity" against plague is influenced by the physiological condition of the whole body, in particular by characteristics of heat regulation. *R. S. F. Hennessey*

TANAKA, H., IKUZAWA, M., TODA, N., OKA, M. & KAMEDA, Y. **[Medical Zoological Studies on Rats in Osaka City (IV)]** *J. Osaka City Med. Center.* 1958, Aug., v. 7, No. 8, 680–84. [11 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"1. A study was made of rats in Osaka City from December '55 to February '56, as follows:

"1) Of the 1,443 rats observed 938 (64%) were R. rattus, 506 (35%) R. norvegicus and 15 (1%) R.n. hibernicus. As to sex females were predominant.

"2) Of external parasites C. fasciatus was most abundant, Tunga caecigena was found on the conches of 15 rats.

"2. Another study was made of rats from December '56 to February '57, as follows:

"1) Of total 384 rats observed, 159 (44%) were R. rattus, 225 (56%) R. norvegicus. R. norvegicus was predominant at the portside and the center area of the city, revealing a female predominance in sex distribution.

"2) As to external parasites which were found rather small in number during the season observed L. musculi was most abundant."

LHOSTE, J. **Les rongeurs domestiques nuisibles. Aperçu sur leur légende, leur histoire, leur vie, les dangers qu'ils représentent et les moyens de les combattre.** [History, Life and Dangers of Harmful Domestic Plague Rodents and their Control.] pp. vi + 149, 48 figs. 1955. Paris 6e. Dunod, 92, Rue Bonaparte. [16s.]

In spite of the title this book is concerned less with domestic rodents than with their destruction. It is divided into two parts. Part I, consisting of 2 chapters, occupies 62 pages. The first chapter describes the two species of domestic rats and two species of domestic mice, their internal and ectoparasites [very briefly], a short reference to the diseases they convey to man and domestic stock, and the traces by which their presence can be recognized and a rough estimation made of their numbers. The second chapter describes the indirect means of controlling domestic rodents, such as sanitary disposal of refuse and the rat-proofing of buildings.

The second part is devoted to means of rodent destruction. Chapter III deals briefly with trapping, and the next chapter discusses biological control by cats, dogs and ferrets, and bacterial means of control. The last chapter, Chapter V, occupies nearly half the book and is concerned with chemical means of rodent destruction. Gassing is recommended as the most reliable method of destruction of rats and their ectoparasites. Hydrocyanic acid, chloropicrin, sulphur dioxide and methylbromide are described and compared. The next

section deals with poison powders, also known as tracking powders, which when scattered on runways are picked up on the fur of the rodents and are licked off. The method of employing these powders is described and it is pointed out that no preparation and no baiting are required. ANTU and the anti-coagulant rodenticides are the most suitable poisons for the purpose.

The next 50 pages are concerned with control by oral poisoning which is described in considerable detail. Baits and methods of presenting them are discussed and it is pointed out that these are of major importance in the campaign. The system of prebaiting is recommended as is also the addition of an emetic to the poisoned bait to ensure vomiting if it is swallowed by man or his stock ; rats are unable to vomit. The various poisons are described fully, their toxicity and the antidotes to be used in case of accidental poisoning. The 6 anticoagulant poisons are dealt with in detail and it is concluded that Warfarin remains the most effective. Pivalyl (2-pivalyl 1–3 indanedione) has been found toxic to *Calandra* and *Tribolium* species invading grain and flour, and to cockroaches and certain other insects. The ways of using the different poisons are given in detail, and are illustrated. At the end of this chapter there are 4 pages of conclusions which contain much sound advice concerning rat control and the measures to use in particular circumstances.

This book provides in small space a great deal of information about domestic rodent control, especially control by poisoning. It is mainly concerned with European conditions which provide all the examples, but the baits mentioned include exotic vegetables and fruits. Those who are concerned with rodent control will find this a useful book of reference and a valuable handbook of practice. *T. H. Davey*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

CHATTERJEE, B. R., RUDRA, B. C. & MUKERJEE, S. **Studies on Cholera Infection and Cholera Immunization. Part III: Attempts for Demonstration of Red Cell Sensitizing and Haemagglutination Inhibiting Antigens in the Serum of Cholera Patients.** *Ann. Biochem. & Exper. Med.* Calcutta. 1959, Jan., v. 19, No. 1, 1–4. [10 refs.]

"Sera from 25 cases of cholera were tested for the presence of red cell sensitizing and haemagglutination inhibiting antigens of *V. cholerae*. Results were uniformly negative."

CHATTERJEE, H. N., BASU, D. K. & CHAKRAVARTY, P. K. **A Study of Cholera Stools and the Associated Clinical Features.** *J. Hyg., Epidemiol., Microbiol. & Immunol.* Prague. 1958, v. 2, No. 2, 172–83. [34 refs.]

In a study of 357 patients from whose stools the cholera vibrio was cultured, it was found that in 47% the stools had the classical rice-water appearance but that in the remainder they were liquid and either bile stained, mixed with much

mucus or faeculent. Although pus cells are commonly considered to be absent from stools in cholera, they were present in 74·5% in this series. Trophozoites of *Entamoeba histolytica* were found in 15, *i.e.* 4·2% of the patients, and all 15 suffered from severe toxic symptoms with great restlessness and in some cases delirium. Oxytetracycline was given to 7 of the doubly infected patients and all recovered; the remaining 8 were not given oxytetracycline and of these 3 died.

A blue or black tongue is considered to be an important sign in severe cases of cholera and where present, infusions of plasma are recommended. [It is not stated to what this blueness is attributed nor whether it was associated with cyanosis elsewhere.] Blueness of the tongue was noted in 13 of the patients in whose stools *E. histolytica* were found. *Trichomonas intestinalis*, *Balantidium coli* and various helminthic infections were found in a considerable proportion of the remaining patients and in 4, *Shigella flexneri* organisms were isolated by culture of the stools. Infection with *Ascaris lumbricoides* was associated with prolongation of the diarrhoea and it was found that administration of santonin in doses of ½–1 grain often expelled the worms with much symptomatic relief.

Blood was detectable macroscopically in the stools of 38 of the patients, but in these the mortality was not greater than in the remainder of the series. Administration of the juice of the entire plant of the Indian herb *Euphorbia pilulifera* alternately with the juice of *Coleus aromaticus* [this *Bulletin*, 1954, v. 51, 381] rapidly brought about disappearance of the red cells from the stools in these cases. [It is stated that "most of the less costly and effective anthelmintics require a cleansing purgative, which, one is very reluctant to give in the cholera ward during an epidemic". Surely the purging which occurs in cholera is sufficient to render further purging unnecessary, even if it were admitted that it is desirable as a preliminary to anthelmintic treatment—this too, however, is something with which most workers would not agree.]

A. W. Woodruff

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

NAKAMURA, M. **Inhibition of** *Entamoeba histolytica in vitro* **by Specific Antibody.** *Parasitology*. 1959, May, v. 49, Nos. 1/2, 104–7 [12 refs.]

The present author was able to maintain *Entamoeba histolytica* in absence of bacteria for a limited period [this *Bulletin*, 1956, v. 53, 318]. He has used trophozoites from such a preparation to immunize rabbits by intravenous infection so that the antiserum obtained could be used in assay by a culture inhibition test. A number of strains of *E. histolytica* were used for this purpose. The antiserum was sterilized by filtration and its effect studied on bacteria-free cultures in biphasic medium containing penicillin and streptomycin with 20% antiserum in the overlay, while controls contained normal

rabbit serum under anaerobic conditions. Normal human serum and serum from patients with past history of amoebiasis were also used.

After 3–4 days at 37°C. counts of amoebae were made. There was definite inhibition by the antisera in the cultures but the different strains of amoebae did not vary much in their response. Complete inhibition of growth was never attained.

The value of the above method or the effect of different strains of parasite on the result in serodiagnosis is still not proved. The best antigens were those prepared by freezing and thawing in formalin. *J. D. Fulton*

MAGAUDDA-BORZÌ, L. & PENNISI, L. Attività amebicida di varie sostanze (antibiotici e coloranti) verso alcuni stipiti di *E. histolytica*, coltivati in terreno mono e difasico. [**Amoebicidal Activity of Various Antibiotics and Dyes against Strains of** *Entamoeba histolytica* **cultivated in Mono- and Diphasic Media**] *Riv. di Parassit.* Rome. 1958, Oct., v. 19, No. 4, 237–47. English summary (6 lines).

The investigation described in this paper was carried out with the object of determining the influence of different culture media and strains of *Entamoeba histolytica* upon the amoebicidal action *in vitro* of various antibiotics and dyes. For this purpose the authors used 4 strains of amoebae, grown in the Boeck-Drbohlav diphasic medium and in a monophasic medium composed of Locke's solution and horse serum. The following 14 substances in various concentrations were tested *in vitro* for amoebicidal activity: Achromycin (=tetracycline), bacitracin, cycloserine, chloramphenicol, Colimycin, oleandomycin, spiramycin, polymyxin, Terramycin (=oxytetracycline), Acriflavine, methyl violet, gentian violet, brilliant green, malachite green. The results were assessed by microscopical examination of the cultures after incubation for 48 hours at 37°C.

The results are shown in 5 tables, from which it is seen that the highest amoebicidal effect was produced by oxytetracycline, Achromycin, Acriflavine and methyl violet, whereas the new antibiotics, oleandomycin and spiramycin showed only slight activity. Moreover, it was found that lower concentrations of the chemical were required to produce the desired effect in cultures in monophasic medium, than in cultures grown in diphasic medium. It was also shown that the amoebicidal effect varied according to the strain upon which the compounds were tested. That this difference was not due to variation in the concomitant flora was evident from the fact that both the most resistant strain ("Hamburg") and the most susceptible ("Naples") were associated with identical bacteria (*Pseudomonas pyocyanea*, *Escherichia coli* and an anaerobe). *C. A. Hoare*

RELAPSING FEVER AND OTHER SPIROCHAETOSES

MISHCHENKO, N. K. **Geographical Adaptation of Foci of Relapsing Fever.** *J. Microbiol., Epidemiol. & Immunobiol.* London. 1958, v. 29, Nos. 1/2, 230–34. [10 refs.] [Translated from Russian.]

SLESARENKO, V. V. **[On the Biology of *Alectorobius asperus*, the Carrier of Tick-Borne Relapsing Fever in the Ukraine]** *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 2, 157–63, 3 figs. [18 refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"Several cases of tick-borne relapsing fever were registered in 1953–1956 in Kherson and Nikolaev regions. The tick-carrier Alectorobius asperus verrucosus was found on the right bank of the Dnieper and both banks of the Ingulets river. The paper gives a description of its habitat and morphology, as well as of optimum life conditions. It also contains a study on the duration of the phases of its individual development.

"As demonstrated the tick, in natural surroundings feeds on Natrix natrix L. and is often spontaneously infected with spirochaetes.

"The paper also discusses prophylaxis against this infection."

YAWS AND OTHER TREPONEMATOSES

RELVICH, A. L. **Observations on the Rate of Resolution of Yaws Lesions after Procaine Benzyl Penicillin Treatment.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Jan., v. 53, No. 1, 75–7.

In this paper the author records experience gained in Western Nigeria on the rate of resolution of the lesions of yaws under the influence of a single dose of a depot penicillin given in a mass treatment campaign. The impressions gained are purely clinical, serological studies being impossible under conditions in the field. Out of the series of 83 patients, the majority were schoolchildren of either sex, only 18 adults and 19 young children being included. Patients were observed weekly or every fortnight during the 4 months succeeding treatment, only a minority being available for review after an interval of more than 1 year. The antibiotic, in the form of PAM, was given at a dosage of 0·6 mega unit to patients under 15 years old and 1·2 mega units to those above this age.

In early skin lesions activity ceased within 2 weeks, and within 4 weeks resolution was complete in nearly every case. The resultant pigmentary disturbance, either hypo- or hyperpigmentation, persisted much longer, and was still present after 18 weeks in 9 out of 34 patients. Early bone lesions [presumably osteo-periostitis] were observed in 2 children only, in whom they resolved in 2 and 7 weeks respectively. Palmar hyperkeratosis was slower to resolve than were the earlier types of skin lesions, 8–14 weeks usually being required: the condition might relapse and require further treatment.

The author suscribes to the view that deformity of the fingers resembling Dupuytren's contracture is attributable to yaws in an area in which this disease is endemic [see WALTERS and ZAHRA, this *Bulletin*, 1957, v. 54, 1417] and has noted marked improvement in each of 10 cases within 14 weeks of treatment. Ganglion formation on tendon sheaths has often been attributed to yaws and the author noted subsidence of this type of lesion after penicillin injection in each of 2 patients. *J. H. Walters*

PÉREZ-MIRAVETE, A. & VALDEZ DE MACÍAS, A. M. Inespecificidad de la reacción de fijación de complemento con antigeno de linfogranuloma venéreo en sueros de pintos. [**Non-Specific Complement-Fixation Reactions with Lymphogranuloma venereum Antigen in Cases of Pinta**] *Rev. Latinoamer. Microbiol.* Mexico. 1958, June 30, v. 1, No. 2, 167–70.

The English summary appended to the paper is as follows:—

"A series of complement fixation tests were carried out with lymphogranuloma venereum antigen in sera obtained from 22 pinta patients. The tests were positive in all cases (100%). The authors think that the results could be explained better as a non specific reaction than with Rake's supposition of the coexistence of two different infections."

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

ETHIOPIA. **Report of the First National Leprosy Conference of Ethiopia, Addis Ababa, 1957.** 80 pp. [?1957.]

The Conference was held from August 29–31, 1957, and according to a list given there were 28 members attending. These included representatives of Government and Mission leprosaria and other hospitals, public health authorities, representatives of WHO and UNICEF and delegates from other countries.

Leprosy is a major health problem in Ethiopia. A survey made under WHO in 1952 estimated 36,000 cases of leprosy in a total population of 15 million, but "from Dr. Schaller's recent surveys we know that there probably are many more lepers than formerly estimated". The sex distribution is interesting: of 100 patients 72 are men and 28 women. Children of 12 or under make 10% of diagnosed cases.

Treatment is given in 2 Government and 2 Mission hospitals, to 1,735 patients. There are segregation villages in 6 provinces with 1,754 patients. The greatest importance in leprosy control is given to 16 out-patient clinics in 8 provinces which are treating 26,651 patients, and the demand is so great that new clinics will have to be opened. In a children's village about 400 children "are having a real family type home and attention is given to their education and their future". WHO and UNICEF are providing support for the Ethiopian leprosy control service, and the aim is to have 100,000 patients under treatment by the end of 1960.

At the Conference several papers were read on clinical and pathological aspects, and on the work on leprosy done in other countries.

A report is made of favourable results in 5 cases of tuberculoid and 15 of lepromatous leprosy with daily intramuscular injections of 200,000 to 400,000 units of hydroxyprocaine penicillin. "Signs towards a change for the better became visible more rapidly than would be seen with treatment by DDS" [but apparently no controls were used in the trial]. *Ernest Muir*

SUGAI, K. [**Histopathological Studies on Human Leprosy. IV. Histochemical Analysis of Abnormal Fats in Leprous Lesions, especially on the Fat Deposition in Lymphnodes**] *Lepro.* 1958, May, v. 27, No. 3, 215–27, 18 figs. [39 refs.] [In Japanese.] English summary.

BREÑA B., G. & MALACARA, M. Estudios serológicos en enfermos de lepra. [**Serological Studies in Leprosy Patients**] *Dermatología.* Mexico. 1958, Dec., v. 2, Nos. 1/4, 56–66, 9 graphs. [20 refs.] English summary (4 lines).

8 authors are quoted as having recorded positive serological reactions in leprosy patients in percentages varying from 24·8 to 65.

The authors themselves tested the serum of 82 leprosy patients by 4 standard methods: Kahn, Mazzini, Kolmer Wassermann and VDRL. They also tested the same sera with the complement-fixation method based on a protein antigen isolated from avirulent treponemata (Reiter) (RPCF). This latter antigen is said to have the advantages that it is less costly, is more stable, and is more specific for syphilis.

Of the 82 sera tested 54·8% were positive, with different degrees of positivity, while only 13·4% were positive with RPCF antigen. Comparisons are shown in graphs of positive reactions in lepromatous and non-lepromatous cases, the former having the larger percentage of positives. The positive reaction with the other 4 antigens was found to have a relationship with the erythrocyte sedimentation results and to be increased by sulphone treatment; but with the RPCF antigen there was not this relationship. *Ernest Muir*

RAMOS E SILVA, J. **On "Hypodermitis nodularis lepromatosa recidivans" (Erythema nodosum leproticum).** *Rev. Brasileira Leprologia.* S. Paulo. 1958, July–Dec., v. 26, Nos. 3/4, 159–72, 9 figs. [21 refs.] [Portuguese version 155–8.]

An account of 2 cases.

MANNWEILER, E. Die Chemotherapie der Lepra. [**The Chemotherapy of Leprosy**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Apr., v. 10, No. 1, 95–117. [176 refs.]

A full review and discussion.

YANAGISAWA, K., ASAMI, N., MAEDA, M. & ISHIHARA, S. [**Prophylaxis of Leprosy with Dried BCG Vaccine. II**] *Lepro.* 1958, May, v. 27, No. 3, 242–7, 6 figs. [In Japanese.]

The English summary appended to the paper is as follows:—

"Normal healthy school children (6–8 years of age) with negative lepromin and tuberculin reactions, were inoculated with dried BCG vaccine by the intracutaneous method or scarification and the reactions examined after 8–11 weeks or 1 year.

"1) Regardless of the method of inoculation, the lepromin reaction was 70·8–72·6% positive and the tuberculin reaction was 82·9–84·0% positive after 1 year. A considerably high correlation was maintained between the size of the

erythema induced by both reaction tests at all stages following inoculation of BCG.

" 2) Injection of 0·1% lactate solution as a placebo instead of BCG vaccine resulted in a 46·7% positive lepromin reaction and 51·1% positive tuberculin reaction after 1 year. It is suggested that it is due to the fact that both the lepromin and tuberculin reactions are allergy reactions."

KUSAKA, T. **Diphosphopyridine Nucleotidase of Murine Leprosy Bacilli.** *Japanese J. Med. Sci. & Biol.* 1958, Dec., v. 11, No. 6, 501–2.

SUSHIDA, K. & YAMADA, N. **[Immunological Studies on Murine Leprosy. II. Relation between Resistance to Infection of Mice Immunized with Killed Murine Leprosy Bacilli and the Serum Protein Fraction Pattern]** *Lepro.* 1958, May, v. 27, No. 3, 263–70, 4 figs. [12 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

" This study was undertaken in an attempt to discover an analogy in human leprosy by conducting immunological experiments on murine leprosy, as reported previously. Heat killed murine leprosy bacilli vaccine was prepared by the method described by Cauland and Saenz for tubercle bacilli vaccine, using olive oil or liquid paraffin as an adjuvant, and mice were immunized with these vaccines, respectively. The resistance to murine leprosy infection was tested utilizing the screening method of Nishimura et al. The serum protein and glycoprotein fractions of the immunized mice were also examined by paper electrophoresis. The following results were obtained;

" 1) The olive oil vaccine has a considerably strong preventative action against murine leprosy infection and the liquid paraffin vaccine also has an inhibitory effect. The heat-killed vaccine, to which no adjuvant was added, showed a little suppression on infection compared to the unvaccinated control.

" 2) An increase in α_2-globulin and β-globulin was noted following inoculation with the olive oil, liquid paraffin and simple heat-killed vaccine and the increase was the highest by the inoculation of the olive oil vaccine which had the greatest preventative effect, followed by the liquid paraffin vaccine. The findings with the simple heat-killed vaccine were close to those of the normal, but these alterations disappeared during three months after the challenge with murine leprosy bacilli.

" 3) No significant changes were noted in the serum glycoprotein fractions following inoculation of any of the vaccines. However, the α-globulin and β-globulin showed tendency to increase after the challenge with murine leprosy bacilli."

CHANG, Y. T., with the technical assistance of R. W. SCAGGS. **Effects of Kanamycin, Streptovaricin, Paromomycin, Novobiocin, and Ristocetin on Murine Leprosy.** *Amer. Rev. Tuberculosis.* 1959, v. 79, No. 5, 673–6. [Refs. in footnotes.]

" The effects of kanamycin, streptovaricin, paromomycin, novobiocin, and ristocetin were studied on murine leprosy in the mouse. Kanamycin,

streptovaricin, and paromomycin possessed suppressive activity in both three-week and three-month experiments. Novobiocin and ristocetin showed no activity."

TODA, T., MORI, R. & TOKUNAGA, T. **[Studies on the Chemotherapy of Leprosy. I. Prevention of Murine Leprosy Infection by 3-Amino-4-Hydroxybenzoic Acid Hydrazide and ω-Anilino-Undecanoic Acid]** *Lepro.* 1958, May, v. 27, No. 3, 271–4. [11 refs.] [In Japanese.]

The English summary appended to the paper is as follows:—

"It was found by Toda and Tokunaga that 3-amino-4-hydroxybenzoic acid hydrazide (ABH) and ω-anilino-undecanoic acid (ω-AUA) had some effect on the tubercle bacilli and were effective in experimental tuberculosis in mice. The effect of these agents in preventing murine leprosy was therefore investigated. It was found that ABH had some infection suppressing action. Application of this agent in human leprosy is being studied in view of this finding together with its effect in experimental tuberculosis in mice."

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:— TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

ZAKARIA, Hanna. **The Interrelationships of the Human and Molluscan Hosts of *Schistosoma haematobium* and the more Common Ways of Exposure to Bilharzial Infection in Iraq.** *J. Faculty of Med., Baghdad.* 1959, Apr., v. 1 (n.s.), No. 2, 53–68, 9 figs. (1 coloured) on 4 pls. [16 refs.]

Urinary schistosomiasis in Iraq is primarily a rural disease because infected waters in canals and marshes are common there while cities and large towns are supplied with potable water. Infected persons reporting for treatment are steadily increasing in number in spite of control measures. The incidence of infection varies inversely with housing density and levels of hygiene.

The ways in which infection is contracted in Iraq are enumerated. They include contact with infected water while engaged in agricultural or maintenance work in canals and marshes; handling or consumption of freshly washed raw vegetables; cleaning of vegetables and culinary utensils in canals; bathing in the shade of willow shrubs on the canal banks which are sites specially attractive to vector snails; fishing and bathing in canals, marshes, or in the drains dug round houses to provide soil for raising the floor; the use of infected water for domestic purposes; the ritual washing of face, hands, genitalia and anal region before prayer.

Cercarial dermatitis, which is described and illustrated with a fine colour plate, is common in canal maintenance workers and is believed to be due in Iraq to *Schistosoma haematobium* cercariae. The modes of infection also are depicted in photographs. *T. H. Davey*

WEBBE, G. **A Bilharzia and Molluscan Survey in the Handeni and Korogwe Districts of Tanganyika.** *J. Trop. Med. & Hyg.* 1959, Feb., v. 62, No. 2, 37–42, 1 map. [23 refs.]

" A bilharzia and molluscan survey carried out in parts of the Handeni and Korogwe districts is described. The urines of 1,061 and 428 persons respectively were examined in these areas. In Handeni district 17·4% of the urines showed ova of *S. haematobium*, while in the Korogwe area 51·1% were positive.

" In Handeni district the highest incidence of *S. haematobium* was in the 16–20 age group, in which 20·3% of a total of 152 males and females were found to be passing ova, and 49·6% of the 141 males of this group were passing either ova or red blood cells or both. There was no great difference between this group and the 11–15 age group.

" The incidence of *S. haematobium* infections in the Handeni area is compared with the incidence in a coastal area; some factors responsible for the contrasting rates are discussed. The incidence of *S. haematobium* infections in the Korogwe area follows the coastal pattern closely.

" The surveys carried out in the Tanga Province show that transmission is often local and likely to be variable in nature. An adequate control project would involve difficulties.

" During the snail survey *B.* (*Physopsis*) *globosus*, *B.* (*Physopsis*) *nasutus*, *B.* (*Physopsis*) *africanus ovoideus*, *B.* (*Bulinus*) *forskalii* and *B.* (*Bulinus*) *tropicus* were found."

FRAGA DE AZEVEDO, J. & DE MEDEIROS, Lídia do C. M. Bases pour la classification des Gastéropodes pulmonés d'eau douce. Sur la nécessité d'uniformiser les méthodes de classification. [**Basis of Classification of Freshwater Snails. The Necessity of Uniform Methods of Classification**] *Acta Tropica.* Basle. 1959, v. 16, No. 1, 38–62, 23 figs. [17 refs.]

The classification of the snail intermediate hosts of schistosomiasis is the concern of the authors of this paper; they draw attention to the inadequacies of a system based on vague descriptions of characters of both shells and soft parts. They suggest the introduction of more critical methods in the study of shells enabling numerical values to be given to such features as depth of umbilicus in preference to the current usage of terms such as " fairly deep ". The examination of anatomical characters should be extended to organ systems other than the genitalia and again more attention must be given to clear, unequivocal descriptions of the results observed. Suggestions are made that characters, such as susceptibility to infection with *Schistosoma* spp., chromosome numbers, cross-fertilizing experiments and biochemical analysis of various secretions, should be investigated.

The example of a key for snail identification which is given is taken from the authors' earlier work on the freshwater mollusca of the Sul do Save province of Moçambique, and the majority of the illustrations originate from the same source [this *Bulletin*, 1958, v. 55, 282].

The paper concludes with the suggestion that meetings between malacologists should be organized in order that general agreement might be reached over the methods to be used in the study of snails of economic importance.

C. A. Wright

BORTOLINI, G. Immunità e allergia nella diagnosi della malattia da schistosoma (rivista sintetica). [**A Review of Immunity and Allergy in the Diagnosis of Schistosomiasis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1959, Mar., v. 40, No. 3, 145–68. [90 refs.] English summary (6 lines).

GUIRGUIS, S. & EL-KATEB, H. **Bilharziasis of the Adrenal Glands.** *J. Trop. Med. & Hyg.* 1959, May, v. 62, No. 5, 103–5, 4 figs.

Though schistosome eggs have been recovered from many organs of the body there is no specific and detailed record of their recovery from the adrenals. The adrenals of 2 patients coming to autopsy in Egypt were found to be so affected. The first of these patients had living *Schistosoma haematobium* eggs in the adrenal cortex and medulla, without any cellular reaction. The second had both living and calcified [? *Schistosoma mansoni*] eggs in the adrenal medulla, again without a surrounding cellular reaction or fibrosis. In neither case was there clinical evidence during life of adrenal dysfunction.

Serial sections of adrenals from a number of other patients with severe schistosomal infection failed to yield the eggs in these organs; schistosomal adrenal involvement in schistosomiasis must therefore be rare. The adrenals may be involved by immigrant worms during their first development, or later by embolism of adult worms or their eggs; the authors think the latter more probable. *A. R. D. Adams*

POIRIER, A. & TRÉGUIER, J. Leucose aiguë au cours d'une affection bilharzienne à *S. mansoni*. [**Acute Leucosis in** *Schistosoma mansoni* **Infection**] *Bull. Soc. Path. Exot.* 1958, Nov.–Dec., v. 51, No. 6, 901–3, 4 figs. on pl.

RICHERT, J. H. & KRAKAUR, R. B. **Diffuse Pulmonary Schistosomiasis. Report of Two Cases proved by Lung Biopsy.** *J. Amer. Med. Ass.* 1959, Mar. 21, v. 169, No. 12, 1302–6, 4 figs. [12 refs.]

The patients were Puerto Rican soldiers in the U.S. Army who were serving in the continental United States at the time of their illness.

MILLEMANN, R. E. & THONARD, J. C. **Protease Activity in Schistosome Cercariae.** *Exper. Parasit.* New York. 1959, Apr., v. 8, No. 2, 129–36. [27 refs.]

"It has been shown that the cercariae of *Schistosomatium douthitti* and *Schistosoma mansoni* do not possess a true collagenase as determined by incubation of living cercariae and cercarial homogenates with human gingival tissue. These studies confirmed the work of others in showing that these cercariae possess potent proteases as indicated by the liberation of dye material from azocoll.

"The implications of these findings in terms of the possible mechanism of penetration of host tissue by schistosome cercariae are discussed."

[See this *Bulletin*, 1955, v. 52, 374.]

EL RAGGAL, M. Wird das Geschlecht der Schistosomen durch das der Wirtsschnecke beeinflusst? **[Is the Sex of a Schistosome influenced by that of the Snail Host?]** *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Apr., v. 10, No. 1, 66–70. [12 refs.]

The English summary appended to the paper is as follows:—

"Ottolina's theory concerning the possible effect of sexual hormones produced by the immediate host, i.e. snails, on the sex type of the following generations of schistosomes was studied. Male and female *Oncomelania* snails were infected with one or more miracidia of *Schistosoma japonicum*. The resulting sex of the worms as gained from infected mice showed that no influence could be deduced."

ASAMOTO, A. **[A Pathohistological Investigation of a Cirrhotic Liver in Schistosomiasis japonica]** *Igaku Kenkyu.* Fukuoka. 1959, Feb., v. 29, No. 2, 624–46, 31 figs. [50 refs.] [In Japanese.]

The author, from Kyushu University hospital, Japan, describes a histological study of liver specimens removed at laparatomy from 19 patients having *Schistosoma japonicum* infection. He recognizes 3 types of liver cirrhosis in this disease—periportal fibrotic, intermediate and pseudolobular. These types correlated approximately with the time since infection and the number of eggs found in the liver.

The proliferating connective tissue was distributed unevenly in the liver: it was most abundant in Glisson's capsule where eggs were present in large numbers; this relationship with the number of eggs was found throughout the liver. As eggs became calcified or transformed, surrounding cell infiltration decreased and the granuloma was converted into fibrotic tissue. It would appear that repeated infection with *S. japonicum* over a long period resulted in the appearance of a sufficient number of eggs in the liver to play an important part in the development of cirrhosis.

Two specimens were examined stereoscopically and the appearances found are described.

The author makes the point that portal hypertension in this disease should be identified at its earliest possible stage and recommends a "relatively simple surgical procedure" for its treatment: this is described in the English summary as "blocking of the blood stream for esophageal varices by splenectomy and concurrent resection of the gastric coronary vein".

H. J. O'D. Burke-Gaffney

LU, Sung-Ts'e & LI, Ch'uan-Chen. **Exfoliative Dermatitis due to Antimony Potassium Tartrate. A Case Report.** *Chinese Med. J.* Peking. 1959, May, v. 78, No. 5, 456.

SIGALAS, R., LENG-LEVY, J., DAVID-CHAUSSÉ, J., VEAUX, R., WONE, C. & NAIL, J. A propos d'un cas de distomatose hépato-bilaire à *Dicrocoelium dendriticum*. **[A Case of Hepato-Biliary Distomatiasis due to** *Dicrocoelium dendriticum***]** *J. Méd. de Bordeaux.* 1959, May, v. 136, No. 5, 585–92.

See this *Bulletin*, 1957, v. 54, 318.

HEYNEMAN, D. & WELSH, J. F. **Action of Homologous Antiserum *in vitro* against Life Cycle Stages of *Hymenolepis nana*, the Dwarf Mouse Tapeworm.** *Exper. Parasit.* New York. 1959, Apr., v. 8, No. 2, 119–28, 4 figs. on pl. [26 refs.]

"An *in vitro* technique is described by which each phase of the life cycle of the dwarf mouse tapeworm, *Hymenolepis nana*, has been tested against antiserum developed in rabbits against the adult worm antigens. Specific actions against the egg include: a precipitation inside the outer shell membrane, a withdrawal of the central membrane from the embryophore, agglutination of intact eggs, and a reduction of egg infectivity in mice to about 1/20 the control level. Effects against the cysticercoids include: cuticular bubbling on the tail, eversion of rostellum, immobilization of suckers, and reduction of infectivity to about $\frac{1}{4}$ that of cysticercoids incubated in normal serum, and about $\frac{1}{8}$ of those maintained in saline and 5% glucose. Action of specific antiserum on adults: increased motility, increased contracture causing rupture and spilling of eggs into the incubation medium (where they agglutinate); and, finally, a precipitation layer. This layer appears first at the scolex and then completely envelops at least some of the worms, and is apparent on most of the other worms in antiserum. No such responses were seen in eggs, cysticercoids, or adults in normal serum.

"Mode of action of the antiserum is briefly discussed and compared to the pattern characteristic of certain nematodes in which similar precipitation phenomena have been described."

VAN KEULEN, A. Cysticercose en vleeskeuring I. [**Cysticercosis and Meat Inspection (1st part)**] *Tijdschr. v. Diergeneesk.* 1959, May 15, v. 84, No. 10, 526–37, 3 figs. & 3 maps. [13 refs.]

HOFSTRA, K. Cysticercose en vleeskeuring II. [**Cysticercosis and Meat Inspection (2nd part)**] *Ibid.*, 538–47, 5 figs.

The English summary appended to the paper is as follows:—

"After a short introduction and a description of the life-cycle of the parasite, the author discusses the problem of cysticercosis from the economical view and in connection with public health. The results of an epidemiologic research are mentioned and discussed.

"458 infected farms were examined. In 9% the taenia carrier could be traced. In 58% the taenia carrier was anonymous but the infestation was in 16% of townsfolk origin, in 21% of countryside origin, and in 21% caused by flooded rivers. In 33% the way of infestation remained unknown."

FRENKEN, J. H. Cisticercosis subcutánea. Comunicación de un caso. [**A Case of Subcutaneous Cysticercosis**] *Dermatología.* Mexico. 1958, Dec., v. 2, Nos. 1/4, 3–18, 1 diagram, 2 figs. [37 refs.]

The English summary appended to the paper is as follows:—

"A case of subcutaneous cysticercosis is reported. Symptoms erroneously attributed at first to eyes and brain were present. A review of the literature on similar cases is made."

QUATTROCCHI, G. & LA ROSA, F. Sul problema diagnostico e terapeutico della cisticercosi cerebrale. [**Diagnostic and Therapeutic Problems of Cerebral Cysticercosis**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1959, Apr., v. 40, No. 4, 201–16, 2 figs. [24 refs.]

The English summary appended to the paper is as follows:—

"A case of systemic Cysticercosis with cerebral localisation at the meningo-cortical level of the vault is described. There were serious convulsive fits with loss of consciousness and a very high temperature; the other elements of the syndrome were the increase of the cerebrospinal fluid albumin contents and, related to this, a strong positivity of the same liquid reactions; the percentage of eosinophils was rather high.

"The symptoms were promptly checked by Cortisone therapy which proved valuable in avoiding relapses in spite of a high, persistent positivity of the cerebrospinal fluid.

"The Authors deal with the diagnostic and therapeutic problem of cerebral Cysticercosis and put in evidence the importance of some biological reactions of the cerebrospinal fluid and particularly of its eosinophilia, for a positive diagnosis. As for the therapy they acknowledge the valuable action of ACTH and Cortisone in treating and preventing the complex neurologic syndrome of this parasitosis, together with its manifestations of endocrine hypertension.

"The Authors conclude their paper by proposing a plan of medical therapy in which both the hormonal treatment and the antiparasitic drugs of the type of the ethereal extract of male fern and streptomycin are given."

LEIKINA, E. S., LUKASHENKO, N. P., ZORIKHINA, V. I., LAVRENEV, B. K. & MAMEDOV, M. M. [**Natural Foci of *Echinococcus multilocularis* in the Novosibirsk Region**] *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 2, 206–13. [In Russian.]

The English summary appended to the paper is as follows:—

"The work was done mainly in the Barabinsk district of the Novosibirsk region. Wild rodents, dogs and agricultural animals have been investigated for larval and mature forms of the parasite, with concurrent examination of the local population. Rodents in two neighbouring forest districts (Kuibyshev and Maslianinsk) have also been examined.

"The landscape features of the Barabinsk district favour abundance of wild rodents and carnivorous animals, chiefly foxes, wolves, and weasels. The main occupation of the local population is cultivation of grain crops and animal husbandry, and many of them are also engaged in hunting and picking of berries in the steppe.

"Of the total of 3829 wild rodents and insectivores belonging to 16 species, 2000 have been investigated in the Barabinsk, 1692 in the Kuibyshev and 137 in the Mashaninsk districts. In the former, the larval forms of E. multilocularis have been found in 6 of the 334 Ondatra zibethica examined and in one of 274 Microtus oeconomus. In the second district out of the total of 9 rodent species E. multilocularis has been revealed in 2 of the 10 M. oeconomus and in 6 of 56 Clethrionomys rutilus dissected. Investigations in this district are to be continued. No infestation has been established in the Kuibyshev district,

where Arvicola terrestris had been the main subject of investigation. Hence 2 out of 3 districts investigated showed natural foci of multilocular echinococcosis.

" No mature forms of the parasite could be found in 36 dogs subjected to examination. Investigations of agricultural animals at the meat-packing plant demonstrated the presence of unilocular echinococcus in 6·4% of cattle, 23·8% of sheep, and 6·7% of pigs, with no E. multilocularis present.

" Positive Cazzoni tests have been obtained in 26 inhabitants of the Barabinsk district out of 850 persons examined (3·06%). 15 of them had liver changes characteristic of multilocular echinococcosis (enlargement, tubercles, accentuated infiltration). The percentage of subjects showing positive Cazzoni reaction in various age groups has been almost uniform, the only exception being children up to 14 years of age, in whom no positive reactions could be observed. Persons engaged in picking of wild berries (14 out of 227), hunters (3 out of 20), and herdsmen (2 out of 23), i.e. those in close contact with the natural foci, showed the greatest incidence-rate of positive immunobiological and clinical symptoms, this comprising 7·1% in contrast to 1·2% in the case of the other inhabitants. No cases of familial disease were recorded.

" It may be presumed that E. multilocularis infestation of the rural population in the Barabinsk district, is mainly due to their contact with natural foci, and, that dogs, as a source of infestation, are of lesser importance than wild carnivorous animals."

ADDIS, S. & MANDRAS, A. Sull 'impiego della reazione di emoagglutinazione nella diagnosi di idatidosi. [**The Use of Haemagglutination Reaction in the Diagnosis of Hydatidosis**] *Igiene Moderna.* 1958, Nov.–Dec., v. 51, Nos. 11/12, 793–800. English summary (6 lines).

From Sassari (Sardinia) the authors compared the indirect haemagglutination test (HA) with the complement-fixation test (CFT) in patients known to be infected with hydatid disease.

Human group O Rh negative red cells tanned with 1/20,000 tannic acid were used in buffer solutions at *p*H 7·2 and 6·4.

In 34 sera from patients the HA was positive in 27, the CFT positive in 22; in 200 control sera the HA was positive in 2 at low titre (1 in 20) while the CFT was positive in 5.

The test is considered both sensitive and specific; the authors conclude that it can be used either alone, or along with the classical tests.

W. K. Dunscombe

CHARMOT, G. & REYNAUD, R. Le tétrachloréthylène dans le traitement de l'ankylostomose du jeune enfant. [**Tetrachlorethylene in the Treatment of Ankylostomiasis of the Young Child**] *Bull. Soc. Path. Exot.* 1958, July–Aug., v. 51, No. 4, 645–52. [20 refs.]

The authors briefly summarize recent work on the treatment of ankylostomiasis with tetrachlorethylene, the use of which is, they think, reviving. They record the results of their treatment with it of 50 young children, aged 4 months to 5 years at Brazzaville, where the incidence of this disease in children is high.

Of the children treated 9 were aged 4 months to 1 year, 22 were 1 to 2 years, 12 were 2 to 3 years and 7 were 3 to 5 years old. All were anaemic

and details of blood and bone-marrow examinations done are given. All suffered from malnutrition, 19 had oedema, 13 had notable enlargement of the liver and 8 were infected with *Plasmodium falciparum*. Persistent diarrhoea was common and the stools contained eggs of ankylostomes, often in large numbers. *Ascaris* eggs were present in 18 and *Strongyloides larvae* in 10. Hypoproteinemia was habitual, extreme values of 33% being noted.

The dose of tetrachlorethylene given was 0·1 cc. per kgm. body weight, or, when oedema was present, a little less. At first a single dose was given, but this proved ineffective and later the dose was repeated every 4 days till 3 or 4, or sometimes 6, doses had been given. The effects of the drug were observed by simple stool examinations, an average of 2 or 3 being done, though these were continued so far as the children could be supervised. The tetrachlorethylene was given either (a) as a suspension in *julep gommeux*, 1 cc. of which was equivalent to 0·1 cc. of tetrachlorethylene; this had a bad taste and it was necessary to see that the child did not spit it out, or to give a sweet drink with it; (b) the child was made to swallow a rather smaller dose drawn off from the tetrachlorethylene capsule with a syringe of the insulin type; thus for a child weighing 8 kgm. a dose of 0·2 cc. was given. When diarrhoea was present or the child was in a poor state, purges were avoided.

For control of the anaemia iron was given by mouth or intramuscularly. Iron should be continued for a long time, especially if it is given by the mouth, because there may be a delay of several weeks before its effects are noted, and associated infections, which may interfere with iron metabolism, should be treated. In some cases iron alone corrected the haemoglobin value, but when the anaemia was moderate it only partially did this and when the anaemia was severe it had no appreciable effect until several doses of tetrachlorethylene had been given; when the drug and iron were given together the patients recovered more quickly. Persistence of the haemoglobin value at a low level indicates persistence of the worms and, although the value of associated treatments must not be underestimated, removal of the worms is essential. Diet is also important, because malnutrition aggravates the anaemia and oedema. After reduction of the diarrhoea, a diet rich in protein should be given and also vitamins B and C. Large amounts of milk should be avoided, acidified milk being preferable. When absorption from the intestine is defective, aureomycin and cortisone can be useful. Acétazolamide reduced the oedema.

Discussing side-effects the authors noted somnolence in 7 patients and in some the diarrhoea reappeared. Details are given of 3 patients who died. One of these, aged 2, presented the symptoms of kwashiorkor, liver puncture showed a steatosis without glycogen and the haemoglobin was 40%; this child died in coma after tetrachlorethylene. The second child had oedema, an enlarged liver and haemoglobin of 30% and after tetrachlorethylene she died in coma, steatosis of the liver being found at autopsy. The third child, with haemoglobin of 70% and a normal liver, was in a bad state, and after tetrachlorethylene died in coma, autopsy revealing liver steatosis. A fourth child, however, had only 20% haemoglobin and, after tetrachlorethylene, went into coma; there were enlarged liver, subicterus and epileptiform spasms of the fingers of the right hand, yet the child recovered and was discharged cured.

The authors conclude that, although the ideal non-toxic anthelmintic has yet to be found, tetrachlorethylene is at present the best for ankylostomiasis.

For young children a dose of 0·1 cc. per kgm. body weight can be used, but one dose is not enough. The accessory treatment of the anaemia, malnutrition and oedema indicated above should also be given, the toxic effects, and the conditions associated with them described, being borne in mind. *G. Lapage*

ASFORA, J. & MARANHÃO, Maria A. Sôbre a terapêutica da strongiloidíase (novas aquisições do valor). [**The Treatment of Strongyloidiasis**] *Rev. Brasileira Med.* Rio de Janeiro. 1958, May, v. 15, No. 5, 325–30. English summary.

The authors state that the incidence of *Strongyloides stercoralis* in Brazil is round about 17%. As gentian violet does not give the satisfactory results originally attributed to it, even if instilled into the duodenum, they hit on the notion of using mucolytic substances as well to bring the worm into closer contact with the drug.

Treatment as follows was given to 20 patients aged between 14 and 61 years, 3 of whom also had an *Ascaris* infection. The patient having fasted overnight, an Einhorn tube was introduced into the duodenum. Then Panemax 60 gm. dissolved in 250 cc. distilled water was instilled through it, and subsequently an ampoule of Wydase or Hyalozima; then 2–3 minutes later 40 cc. of 1% solution of gentian violet, the tube being withdrawn 3 minutes later. Panemax contains papain and Wydase and Hyalozima contain hyaluronidase. 2 of the patients were given a second treatment.

The criterion of cure adopted was not less than 3 negative specimens (Baermann's method) and the results were: out of 18 patients 10 were cured, and also the 2 who received a second treatment. 4 who vomited immediately after treatment were not cured, though 1 was cured at the second attempt. The remaining 16 tolerated the treatment well. The 3 patients with the *Ascaris* infection were cured of both infections. *W. K. Dunscombe*

TATARINOV, A. L. [**Chinese Drug "Chuanlianpian" for Treatment of Ascariasis in Children**] *Med. Parasit. & Parasitic Dis.* Moscow. 1959, v. 28, No. 2, 221–3. [In Russian.]

The English summary appended to the paper is as follows:—

"According to control analysis treatment of ascariasis with the Chinese drug 'Chuanlianpian', prepared from the root rind of bitter Sychuan melia (Melia Azedarah L.), gave positive results in 77·3% of 880 children subjected to this medication. Because of its simplicity and absence of any side-effects, the mass-treatment with 'Chuanlianpian' preparation is particularly suited for the treatment of large groups of children. It is also effective in the treatment of enterobiasis and tapeworms."

KOPPISCH, E. & OLIVER-GONZÁLEZ, J. **Agglutination of Erythrocytes *in vivo* in Mice after Injection of *Ascaris* Extracts, related to Immunization with Human Erythrocytes.** *Proc. Soc. Exper. Biol. & Med.* 1959, Apr., v. 100, No. 4, 827–9, 4 figs.

"Mice of an A strain were injected intraperitoneally with suspensions of human erythrocytes of Groups B and O, and of subgroups A_1 and A_2. Ten

to fifteen days after last injection of erythrocytes the animals and normal controls were injected intravenously with 1 mg. of an extract prepared from cuticle of *Ascaris lumbricoides*. The purpose of immunization with erythrocytes was to determine whether the α_1, α_2, β, and anti-O agglutinins, developing as a result of artificial immunization, would react *in vivo* with cuticular extract. Histopathological examination of livers and kidneys disclosed: Agglutination of erythrocytes with formation of large clumps in liver and kidneys was seen only in animals immunized against A_2 erythrocytes followed by the cuticular extract. This did not occur in mice inoculated with erythrocytes of Groups B and O and subgroup A_1, also injected with the cuticular extract. No such changes were seen in liver and kidneys of normal mice inoculated with A_2 erythrocytes or cuticular extract alone. Agglutination takes place, therefore, between α_2 agglutinins in plasma and the A_2 isoagglutinogen-like factor in the extract. These findings indicate a definite relationship between blood groups and pathological changes produced by infectious organisms."

HEISCH, R. B., NELSON, G. S. & FURLONG, M. **Studies in Filariasis in East Africa. 1. Filariasis on the Island of Pate, Kenya.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1959, Jan., v. 53, No. 1, 41–53, 1 fig. & 1 map. [38 refs.]

" 1) Filariasis was studied in the village of Faza on Pate Island which lies 5 miles east of the northern part of the Kenya coast. The incidence of *W. bancrofti* in night bloods was 32 per cent. and in day bloods 4 per cent.; the average number of microfilariae per 20 c.mm. was 9·4 and 0·16. The highest parasite rates and densities were in the 16 to 20 age-group.

" 2) A fortnight after mass treatment with diethylcarbamazine the *W. bancrofti* rate fell to 25 per cent. and the microfilarial density to 1·5. Eight months later the infection rate was 16 per cent. and the microfilarial density 1·1.

" 3) Seven filarial species were found in animals. Monkeys (*Cercopithecus aethiops*) were infected with *D. corynodes*; dogs, cats and genets (*Genetta tigrina*) with *W. patei* and *D. repens*. Dogs were also infected with *D. immitis* and a *Dipetalonema*. Donkeys and cows were infected with *Setaria* sp.

" 4) The commonest mosquitoes in houses were *Ae. pembaensis, C.p. fatigans* and *Ae. aegypti*. *Anopheles* were almost absent from Faza; only three *A. gambiae* were caught.

" 5) Precipitin tests indicated that *Ae. pembaensis* feeds on monkeys, dogs, cats, cattle, goats and donkeys as well as man. *C.p. fatigans* and *Ae. aegypti*, though predominantly anthropophilic, also feed on animals. A number of *C.p. fatigans* contained avian blood.

" 6) Over 15,000 mosquitoes were dissected at Faza. The filarial infection rate for *Ae. pembaensis* was 3 per cent. to 4 per cent.; infective larvae were present in 2 per cent. to 3 per cent. Only 2 per cent. of *Ae. aegypti* were infected. After the diethylcarbamazine campaign the *C.p. fatigans* rate fell from 25 per cent. to 6·6 per cent.; the infection rates of the other mosquitoes were unaffected.

" 7) In feeding experiments, only *W. bancrofti* and *D. immitis* developed well in *C.p. fatigans*. *Ae. pembaensis* proved a good experimental host of *W. patei, D. repens, D. immitis, D. corynodes* and the donkey *Setaria*.

" 8) It was found possible to distinguish most of the infective larvae in mosquitoes, and these were studied in 187 mosquitoes found infected in nature. *C.p. fatigans* contained only *W. bancrofti* and *Ae. pembaensis* only animal filariae."

[For earlier studies by the authors, see this *Bulletin*, 1957, v. 54, 592; 1958, v. 55, 1262.]

ROHDE, K. Infektionsversuche mit der Baumwollrattenfilarie *Litomosoides carinii* an weissen Ratten. [**A Study of Infection of White Rats with the Filarial Parasite of Cotton Rats,** *L. carinii*] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1959, Apr., v. 10, No. 1, 70–78. [23 refs.]

" *Litomosoides carinii*, the filariid parasite of the cotton rat, was experimentally transmitted to 19 white rats by tropical rat mites. In 17 of these rats living worms could still be demonstrated 105–149 days after infection, while microfilariae often were detectable in the blood until the rats were killed, the maximum time being 3 months. At the time of dissection the ratio of male to female worms was 1·5 : 1 in white rats, but 0·83 : 1 in cotton rats.

" In another series of experiments, adult filarial worms from recently killed cotton rats were transplanted into the peritoneal cavity of 40 white rats. A small percentage of the parasites was still alive 2–3 weeks after infection, the males being more resistant than the females. In the blood of most rats no microfilariae were demonstrable.

" The results of the first series of experiments—i.e. filariae being still alive in rats 105–145 days following transmission by mites—remain to be confirmed by using a larger number of test animals. These findings might prove useful regarding maintenance of filarial infection in white rats, which are superior to cotton rats as laboratory animals, for chemotherapeutic investigations."

OLSON, L. J. **The Survival of Migratory and Post-Migratory Stages of** *Litomosoides carinii* **in White Rats.** *J. Parasitology.* 1959, Apr., v. 45, No. 2, 182–8, 1 fig. [25 refs.]

D'AUBENTON, F. & BLANC, M. Nouveaux essais d'insecticides concernant la lutte contre l'onchocercose. [**Further Trials of Insecticides in Control of Onchocerciasis**] *Méd. Trop.* Marseilles. 1959, Mar.–Apr., v. 19, No. 2, 217–21.

Previous experiments in connexion with the campaign against onchocerciasis by destruction of *Simulium* larvae have shown that the larvicide of choice is a DDT solution in non-toxic solvent oil, free from Diazinon and kerosene and of 0·96 specific gravity [BLANC and D'AUBENTON, this *Bulletin*, 1956, v. 53, 1160; BLANC, *ibid.*, 1957, v. 54, 76; BLANC and D'AUBENTON, *ibid.*, 1342; BLANC *et al.*, *ibid.*, 1958, v. 55, 1034]. In experimental work, a colouring agent is needed in order to study the penetration of insecticide preparations among piles of stones etc. Fluorescein turned out to be of little use, and methylene blue was tried, but even with this a minimum concentration of 5 mgm. per litre was necessary.

The present paper describes experiments on the toxicity to fish and fish fry of DDT preparations from different sources of supply. The technique employed was to expose fish to insecticide for half an hour in a 50 litre tank, then to wash them in running water and return them to their aquaria for observation. 1 mgm. per litre of DDT is sufficient to kill *Simulium* larvae, but fish were tested up to much higher concentrations. Results indicated that (i) different preparations vary greatly in toxicity, (ii) with favourable preparations, hardy fish may survive 30 minutes' exposure to as much as 18 mgm. per litre, but others are much more susceptible, (iii) repeated exposures are more dangerous than single exposures, (iv) fish fry are intensely susceptible to DDT, 0·5 mgm. per litre being the maximum concentration fairly well tolerated.

The last fact clearly affects the time of year at which river dosing should be undertaken. The fish-breeding season, early in the rains, should be avoided. Since little can be done [in the African savannah] during the dry season, the end of the rains is left as the one period satisfactory to both ichthyologists and entomologists. *B. B. Waddy*

TROMBA, F. G. **Swine as Potential Reservoir Hosts of** *Hepaticola* [*Capillaria*] *hepatica*. [Research Notes.] *J. Parasitology*. 1959, Apr., v. 45, No. 2, 134, 1 fig.

See this *Bulletin*, 1939, v. 36, 850.

NITZULESCO, V., SORESCO, A. & PANAITESCO, D. Sur l'éclosion spontanée des oeufs de trichocéphale. [**The Spontaneous Hatching of Trichocephalus Eggs**] *Arch. Roumaines Path. Expér. et Microbiol.* 1958, Sept.–Dec., v. 17, Nos. 3/4, 449–53, 1 fig.

The English summary appended to the paper is as follows:—

"The phenomenon of spontaneous hatching of trichocephalus eggs has so far not been granted sufficient attention by helminthologists.

"In the cases described above, the vitality of spontaneously hatched larvae was considerably reduced. The authors discuss the causes of this phenomenon. Owing to the spontaneous hatching of larvae and to their death occurring immediately afterwards, a great number of the trichocephalus eggs scattered on the ground are destroyed. The authors are asking themselves whether the observed failure of trichocephalosis to develop in certain areas of this country might not be due precisely to this mode of destruction of the eggs. They consequently consider the phenomenon of spontaneous hatching of trichocephalus eggs to deserve more attention, not only from the biological standpoint, but from the epidemiological point of view as well."

TARTARI, G. & TREVISANI, A. Indagine sulla diffusione dell'ossiuriasi fra la popolazione infantile dell'Alto e del Basso Ferrarese. [**Survey of Enterobiasis in Children in the Upper and Lower Ferrara Region**] *Igiene e San. Pubblica*. Rome. 1959, Mar.–Apr., v. 15, No. 2, 126–35, 1 fig. [21 refs.]

The incidence was 24·6% and 39·1% respectively.

JEZIORANSKA, Alicja & BARCISZEWSKI, Marian. Odczyny immunologiczne w przebiegu epidemii włośnicy w Bydgoszczy w r. 1957. [**Immunological Reactions in the Course of Trichinosis Epidemic in Bydgoszcz (1957)**] *Med. Dośw. i Mikrob.* Warsaw. 1959, v. 11, No. 1, 55–61, 1 fig. [22 refs.]

The English summary appended to the paper is as follows:—

"For the purpose of verification of the clinical diagnosis in the patients from the mass trichinosis in Bydgoszcz (February 1957) the following specific serologic reactions were made: ring precipitation reaction, microprecipitation reaction on live larvae and the reaction of complement fixation. Besides that precipitation reaction with the urine of the individuals in question was made.

"Positive ring precipitation reaction was found in 69% of the cases. The first positive results appeared about the tenth day and their percentage increased with the progress of the disease reaching 85% in the 4th–5th week of the disease.

"The microprecipitation reaction on live larvae proved to be the most specific. The highest percentage of positive results took place in the early phase of the disease.

"The complement fixation reaction was performed in 149 sera in the various phases of the disease. It was confirmed that the number of positive results for the complement fixation reaction increases with the development of the disease. Tables I and II illustrate the results of immunologic reactions according to the phase of the disease calculated in absolute values and in percentages taking into consideration the successiveness of the tests.

"Out of 117 performed reactions of precipitation of urine with immunizing rabbit sera in 24% there were positive reactions. The highest concentration of antigen fraction in urine of patients suffering from trichinosis was between the 10th and the 15th day of the disease."

DEFICIENCY DISEASES

RAOULT, A. Aspects de la malnutrition chez le grand enfant en A.O.F. [**Aspects of Malnutrition in Children in French West Africa**] *Bull. Soc. Path. Exot.* 1958, Sept.–Oct., v. 51, No. 5, 762–92.

This paper is concerned with the health of older children aged 4 to 12 years. It is based on much experience gained from many surveys and is long but covers a wide field. Perhaps the most interesting observations are concerned with analyses of enlargement of the spleen, liver and parotid gland in relation to age. Splenic enlargement, mostly attributable to malaria, reaches a maximum at the fourth year, when nearly 60% of the children may be affected. By the age of 12 this incidence has fallen to 20%. Parotid gland enlargement, probably nutritional in origin, rises to a maximum (30%) at the age of 8 and then sharply declines. Hepatic enlargement, perhaps part nutritional and part infectious in origin, is at a maximum at the age of 7, when over 60% may be affected. By 12 the incidence has fallen to about 5%. In villages receiving regularly skimmed milk the incidence of enlarged liver and parotid glands is much reduced, but that of enlarged spleens unaffected.

Dental fluorosis is also widespread in some areas. *R. Passmore*

RAO, B. R. H. & RAO, P. S. S. **General Health and Nutrition Survey of the Rural Population in Pennathur. Part I: The Nutrition Status Survey.** *Indian J. Med. Sci.* 1958, Sept., v. 12, No. 9, 705–17. [26 refs.] **Part II: A Qualitative Study on Family Meals.** *Ibid.*, 718–25. **Part III: The Quantitative Dietary Survey.** *Ibid.*, 726–30.

These 3 papers from the Department of Preventive and Social Medicine of the Christian Medical College at Vellore record the results of a thorough survey in a South Indian village. The main impression after reading the papers is that life in Pennathur is very similar to what it was in rural India 20 years ago. The World War, the great political changes and the immense scientific endeavours in India have had little effect on this village. The stable article of food is cereals, either rice or millets, which provide over 80% of the calories in the diet. The total food supply, estimated at just over 1,700 and 1,500 calories per day for an adult male and female respectively is insufficient to allow much strenuous physical work. The incidence of conjunctival pigmentation (35%), Bitot's spots (5%), angular stomatitis (14%) dry and rough skin (15%), palpable liver (8%) all reflect the qualitative deficiencies of the diet. Haemoglobin levels were low with mean values of 11·0 gm.% for women and 12·5 gm.% for men and iron deficiency anaemia was common. The death rate was just over 25 with an infant mortality rate around 150, but birth rates were well over 30.

It is obviously very important for the Government to have some scientifically collected knowledge of the state of health and nutrition in rural areas. This survey is, in its way, a model, but it must have been very expensive and is limited to one village. It is to be hoped that the authors will be able to develop methods which can be applied to surveys over much larger areas. Knowledge, such as is provided here, is an essential for all schemes of rural health.

R. Passmore

JANSEN, A. A. J. **Nutrition, Infection and Serum Proteins in Papuans of Netherlands New Guinea.** [Thesis.] 154 pp., 1 map & 15 graphs. [272 refs.] 1959. Doorn: van Heemskerklaan 10, Holland.

This thesis for a Doctorate in Utrecht University records a very thorough study of the nutritional state of the people in 4 widely separate places in the Netherlands New Guinea. Details are given of the diets consumed, the clinical state of the population, their heights and weights and the incidence of infection. Special attention is paid to the levels of serum protein. Compared with European standards the levels of serum albumin are low and of serum globulin high, owing largely to an increased gamma fraction. There is no indication that a genetical factor is responsible for these differences. A fall in serum albumin probably reflects an unsatisfactory protein intake. The gamma globulin fraction is only slightly above the usual European levels in new-born infants, but rises in early childhood, presumably in response to numerous infections.

This report will be an invaluable document for the public health authorities in New Guinea and is full of information useful and indeed essential for those responsible for the health of the area. Of more general interest is the finding that in one island, Biak, the spacing between the children in the families is

wide, being usually 2½ years. In other areas, and among Indonesians and Chinese in general, the interval is much shorter and usually averages 18 to 22 months. The Biaks live under difficult conditions and the long spacing between births is considered as an adaptation to these. The explanation of the wider intervals between births is not clear and the author is not able to state whether physiological or social conditions are responsible. Here is a problem that might repay further study. *R. Passmore*

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. **FAO Nutrition Meetings Reports Series No. 18. Report of the Fourth Conference on Nutrition Problems in Latin America in Guatemala City, Guatemala, from 23 September to 1 October 1957.** pp. vi + 82. 1959: Rome. [Sales agent for U.K., H.M. Stationery Office. [$1.00; 5s.]

The fourth FAO conference on Nutrition Problems in Latin America was attended by some 60 delegates from the countries concerned and also by representatives of the U.S.A. and some European countries. Only 2 of the delegates from Latin America are on the list of attendance at the third congress in 1953. This fact probably reflects both a scarcity of technical experts and the discontinuities in the public services in Latin American countries. It means, however, that much of the work has to be gone over again in succeeding conferences. Endemic goitre and protein malnutrition are recurring subjects for discussion.

This report also gives a full account of the problems of education in nutrition and breaks new ground in a statement of the basic principles in testing and standardizing new protein supplements. The repetition does not make for exciting reading and it is clear that so far comparatively little progress has been achieved in solving the many nutritional problems in the region—despite the excellent work of the Institute of Nutrition for Central America and Panama and of a few smaller institutes. All the more credit would seem to be due to FAO for persevering with these conferences. The cumulative result must, in the end, be the achievement of better standards of health, and education in public health is always a slow process. It is to be hoped that the Spanish edition of this report will be widely read and prove an effective stimulus to action. *R. Passmore*

SÉNÉCAL, J., ROULLIER, C., CAMAIN, R. & DUPIN, H. Étude des lésions hépatiques du Kwashiorkor par la microscopie électronique. [**An Electron Microscopic Study of the Hepatic Lesions in Kwashiorkor**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Oct.–Dec., v. 3, No. 4, 480–83, 8 figs. on 8 pls.

7 electron microscope pictures of the liver in kwashiorkor are reproduced. In the acute stage of the disease the cytoplasm is filled with vacuoles containing fat, some of which are very big. They do not appear to be surrounded by a membrane. The mitochondria are swollen and rarefied. The ergastoplasm is also considerably rarefied. These changes are rapidly reversed by treatment. The mitochondria rapidly regenerate their matrices; regeneration of the ergastoplasm is slower. By the 11th day granules of ribonucleic acid are visible, grouped around the mitochondria. This topographical arrangement

suggests that the mitochondria participate in the regeneration of the ergastoplasma. *R. Passmore*

ARROYAVE, G., VITERI, F., BÉHAR, M. & SCRIMSHAW, N. S. **Impairment of Intestinal Absorption of Vitamin A Palmitate in Severe Protein Malnutrition (Kwashiorkor).** *Amer. J. Clin. Nutrition.* 1959, Mar.–Apr., v. 7, No. 2, 185–90, 2 figs. [18 refs.]

Children with kwashiorkor have been shown to fail to absorb ingested vitamin A, but absorption returns rapidly to normal after a few days of milk therapy. It is suggested that absorption of the vitamin may be dependent on an adequate secretion of pancreatic lipase, which is usually impaired in kwashiorkor [see also this *Bulletin*, 1957, v. 54, 333]. *R. Passmore*

JOSEPH, K., KURIEN, P. P., SWAMINATHAN, M. & SUBRAHMANYAN, V. **The Metabolism of Nitrogen, Calcium and Phosphorus in Undernourished Children. 5. The Effect of Partial or Complete Replacement of Rice in Poor Vegetarian Diets by Ragi (*Eleusine coracana*) on the Metabolism of Nitrogen, Calcium and Phosphorus.** *Brit. J. Nutrition.* 1959, v. 13, No. 2, 213–8. [12 refs.]

"1. The effect on nitrogen, calcium and phosphorus metabolism of replacing 25%, 50% or all of the rice in a poor vegetarian diet by ragi was studied in eight girls aged 9–10 years.

"2. The daily intake of N was nearly the same, 4·41–4·51 g (equivalent to about 28 g protein), on all the diets. The apparent digestibility coefficients of the protein were 71, 67, 64 and 53%, and the mean daily N retentions 1·48, 1·19, 0·89 and 0·52 g, for the rice diet and the diets in which 25%, 50% or all of the rice was replaced by ragi. All the subjects were in positive balance.

"3. The mean daily Ca intakes were 259, 471, 693 and 1151 mg, and the retentions 52, 106, 175 and 226 mg, on the rice diet and the diets in which 25%, 50% or all of the rice was replaced by ragi. The retentions on the three diets containing ragi were significantly higher than that on the rice diet.

"4. The mean daily P intakes were 464, 577, 680 and 887 mg, and the retentions 117, 165, 125 and 135 mg, on the rice diet and the diets in which 25%, 50% or all of the rice was replaced by ragi.

"5. Replacement of some of the rice by ragi will help to overcome the Ca deficiency of rice diets."

PRETORIUS, P. J. & VENTER, E. E. **The Effect of Carob Flour Supplements on the Absorption of Nitrogen by Kwashiorkor Patients.** *J. Trop. Pediatrics.* London. 1959, Mar., v. 4, No. 4, 151–8, 3 figs. [19 refs.]

Carob flour from the fruit of the tree, *Ceratonia sitiqua*, is widely used in the treatment of diarrhoea. It contains a large amount (up to 21%) of lignin, which is said to have high absorptive and hygroscopic powers. This paper records the results of nitrogen balance studies on children receiving the flour. The carob flour impaired the absorption of nitrogen both in children with kwashiorkor and acute diarrhoea and also in children who had been cured and

with normal stools. In both groups nitrogen absorption was only 60% on diets containing the flour and rose to over 80% when the flour was omitted. Provided the protein intake was high (about 1 gm. nitrogen/kgm./day), net amounts of nitrogen retained were satisfactory. With intakes just below half of this amount, absorption of nitrogen was insufficient to maintain a positive balance in one child. Clearly when carob flour is prescribed, it is necessary to see that the protein content of the diet is high. *R. Passmore*

SCRIMSHAW, N. S.; BRESSANI, R.; BÉHAR, M.; VITERI, F. **Supplementation of Cereal Proteins with Amino Acids. I. Effect of Amino Acid Supplementation of Corn-Masa at High Levels of Protein intake on the Nitrogen Retention of Young Children** [SCRIMSHAW, BRESSANI, BÉHAR & VITERI]. *J. Nutrition.* 1958, Dec. 10, v. 66, No. 4, 485–99, 3 figs. [10 refs.] **II. Effect of Amino Acid Supplementation of Corn-Masa at Intermediate Levels of Protein intake on the Nitrogen Retention of Young Children** [BRESSANI, SCRIMSHAW, BÉHAR & VITERI]. *Ibid.*, 501–13, 3 figs.

i. The first paper records studies on 2 boys recently recovered from severe protein malnutrition (kwashiorkor). Nitrogen balances were determined on a diet high in protein (3 gm. per kgm. of body weight). In the basic diet the protein was provided by corn (maize) and the boys were just in balance, but nitrogen retention was markedly increased when the diet was supplemented by tryptophan and lysine. However, retention was reduced when methionine was also added. Valine and threonine also appeared to have a negative effect on retention, at least until after isoleucine was added. The results emphasize the importance of supplementation of vegetable proteins with the proper mixture of essential amino-acids.

ii. The second paper records studies of the nitrogen balances of 3 children convalescent from kwashiorkor with a basal diet of moderate protein content (1·5–2 gm./kgm.). When the protein was all supplied by corn (maize), they were in negative nitrogen balance. Replacement of part of the protein nitrogen by tryptophan, lysine or isoleucine added separately did not lead to a positive balance. But if these amino-acids were given together then nitrogen was retained. Thus it was demonstrated that the supplementation of a cereal protein of relatively poor biological value with the appropriate amino-acids can lead to consistent improvement in nitrogen retention, although intake was not high. *R. Passmore*

GAITONDE, B. B., LEWIS, R. A., PATEL, B. D. & RAO, G. S. **Lysine in the Treatment of Protein Malnutrition.** *J. Trop. Pediatrics.* London. 1959, Mar., v. 4, No. 4, 143–6.

Animal experimentation has suggested that a small lysine supplement to standard low protein diets will improve the nitrogen balance. The authors decided to test the effect of a similar supplement in infantile malnutrition as seen in Bombay, India.

18 infants suffering from grave protein malnutrition, who showed the kwashiorkor syndrome in 16 instances and marasmus without oedema in 2, were divided into comparable groups, one of which received the standard

hospital diet for young children plus a daily supplement of 500 mgm. of lysine, while the other received only the hospital diet and served as a control. Children showing obvious infections and all positive reactors to tuberculin were excluded, though diarrhoea of nutritional origin did not disqualify.

The body weight, total serum proteins and concentrations of the individual protein fractions were estimated initially, after 3 weeks' treatment and at the end of the 6 weeks' experimental period. The gravity of the malnutrition at the start of the experiments is illustrated by the mean serum albumin concentration of 1·50 gm. per 100 ml. shown by the experimental group and that of 1·33 gm. per 100 ml. found in the control group.

During the first 3 weeks' period of treatment loss of oedema fluid and expansion of the plasma volume clouded the interpretation of the changes observed and for this reason judgment was based on the results achieved after the full 6 weeks' treatment. In each group there was an increase in the serum albumin concentration, slight increases in the alpha 2 and beta globulin fractions and a decrease in the gamma globulin moiety. However, the degree of improvement was significantly less in the group receiving the lysine supplement than in the control group, the relative gains in albumin, alpha 2 and beta globulins being 0·94, 0·05 and 0·02 gm. per 100 ml. respectively in the former as compared with 1·10, 0·21 and 0·15 gm. per 100 ml. in the control group. While the gamma globulin decreased by 0·20 gm. per 100 ml. in the experimental group, it fell by 0·38 gm. per 100 ml. in the controls.

[This negative result provides one more example of the adverse effects of any unbalanced dietary supplementation.] *J. H. Walters*

SCHENDEL, H. E., ANTONIS, A. & HANSEN, J. D. L. **Increased Amino-Aciduria in Infants with Kwashiorkor fed Natural and Synthetic Diets.** *Pediatrics.* Springfield, Ill. 1959, Apr., v. 23, No. 4, 662–75. [24 refs.]

This paper records the rates of excretion of amino-acids in the urine in 2 normal children and in 9 children with kwashiorkor. Rates of excretion were high before treatment and fell rapidly when clinical improvement took place. The increased excretion reflected an inability to retain all or most of the 23 amino acids studied and no single acid appeared to contribute disproportionately to the total loss.

This is a long and careful paper and the relative merits of the various ways of expressing excretion rates (*e.g.* in relation to body weight, or creatinine excretion) are discussed. Excretion is also considered in relation to the formula diets.

The excess excretion does not appear to play an important part in the economy of nitrogen metabolism. The amino-acid nitrogen excreted by a normal child on a milk diet amounted to 1·3% of the intake. Children with kwashiorkor on the same diet excreted only about 3·1% of the nitrogen as urinary amino-acids. *R. Passmore*

KAHN, E. **Prognostic Criteria of Severe Protein Malnutrition.** *Amer. J. Clin. Nutrition.* 1959, Mar.–Apr., v. 7, No. 2, 161–5, 2 figs. [11 refs.]

At the Baragwanath Hospital in Johannesburg, the mortality from advanced kwashiorkor was 40% when treatment consisted largely of skimmed milk. It

dropped to 20% when intravenous electrolyte therapy was added, but for the past 3 years it has not been possible to reduce it further. This paper records a careful study of the clinical and laboratory findings in 100 patients. Severe wasting, acute dermatosis, marked enlargement of the liver and a body temperature below 95°F. were associated with a poor prognosis. Many of the children with serum potassium or sodium levels below 4 and 125 MEq/1 respectively died. Patients with enlarged livers may go into stupor and die with hypoglycaemia.

R. Passmore

BEZON, A. Essai dans le kwashiorkor d'un régime supplémenté par le sel de calcium de l'esther choline phosphorique. [**A Trial in Kwashiorkor of a Regime supplemented by the Calcium Salt of the Ester Choline Phosphate**] *Bull. Méd. de l'A.O.F.* Dakar. 1958, Oct.–Dec., v. 3, No. 4, 439–44.

In a clinical trial on 58 children with kwashiorkor receiving a standard therapeutic regime based on powdered dried milk, 31 children received in addition the salt, in a daily dose of 4 gm. This did not change radically the prognosis in children who were seriously ill; however, in children with oedema loss of weight was accelerated and the removal of the oedema appeared to be more rapid.

R. Passmore

HAEMATOLOGY

HUSSAIN, R. & PATWARDHAN, V. N. **Iron Content of Thermal Sweat in Iron-Deficiency Anaemia.** *Lancet.* 1959, May 23, 1073–4.

"The cell-free sweat of 17 women suffering from microcytic hypochromic anaemia contained no iron; and the iron content of their cell-rich sweat was significantly lower than that of 6 healthy women.

"After iron therapy, iron reappeared in the cell-free sweat, and the iron-content of cell-rich sweat increased significantly. Preliminary studies suggest that the increase of iron in cell-rich sweat was probably due to an increase in the iron content of the desquamated epithelial cells.

"While full evaluation of our results must await the completion of further investigations, it seems legitimate to conclude that in iron-deficiency anaemia the body tends to conserve iron by reducing loss through sweat."

RAVISSE, P., CHARMOT, G. & DEMARCHI, J. L'étude cytologique du fer de la moelle osseuse. Applications en pathologie tropicale. [**Cytological Study of Bone-Marrow Iron. Applications in Tropical Pathology**] *Bull. Soc. Path. Exot.* 1958, July–Aug., v. 51, No. 4, 539–43.

The authors applied the Perls reaction for stainable iron to bone marrow preparations, with the following results: (1) Of 31 anaemic hookworm carriers (25 children) the marrow of 28 subjects was devoid of sideroblasts, and small amounts of stainable iron only reappeared after worming and 4 to 6 weeks of iron treatment. (2) In 12 patients with sickle-cell anaemia, sideroblasts were

absent from the marrow in 3 cases, but accounted for up to 80% of the normoblasts in the rest. (3) In 3 cases of kwashiorkor, sideroblasts were numerous.

The main point of interest is the length of time required to restore the iron reserves in chronic hookworm anaemia. *Alan B. Raper*

KAUL, S., DAS GUPTA, A. K. & KRISHNAN, N. R. **Urinary Excretion of Radio-Active Vitamin B_{12} in the Investigation of (Tropical) Nutritional Megaloblastic Anaemias.** *Indian J. Med. Res.* 1959, Mar., v. 47, No. 2, 139–47, 2 figs.

One of the problems facing the physician in India is whether vitamin B12 is absorbed in patients with nutritional megaloblastic anaemia. The diagnosis of this condition depends, in fact, on the exclusion of other causes of megaloblastic haemopoiesis, notably of pernicious anaemia. 14 patients who were diagnosed clinically and also by the usual laboratory techniques as suffering from nutritional megaloblastic anaemia, were studied for their ability to absorb vitamin B12 labelled with ^{58}Co. No less than 7 of them showed a low urinary excretion of the isotope. There was no obvious cause for malabsorption, and there was no difference between the two groups showing a high and a low urinary excretion of vitamin B12. The authors state that absorption may have been normal and the excretion of the vitamin may have been low, either because of a renal defect or of the increased avidity of depleted tissues, which may then be presumed to accumulate the vitamin rapidly, leaving very little for excretion by the kidneys.

The second explanation, at least, is unlikely to apply because when vitamin B12 was given to patients who had shown considerable improvement, the urinary excretion remained as low as it had been at first. Though the series of 14 cases is small it would appear—according to the authors—that interference with the absorption of vitamin B12, by some means not yet understood, may account for many of the so-called nutritional anaemias in India.

H. Lehmann

POTTER, Edith L. **The Antenatal Background of Blood Diseases of Infancy.** *J. Pediatrics.* St. Louis. 1959, May, v. 54, No. 5, 552–565. [34 refs.]

ERLANDSON, Marion E. & HILGARTNER, Margaret. **Hemolytic Disease in the Neonatal Period and Early Infancy.** *J. Pediatrics.* St. Louis. 1959, May, v. 54, No. 5, 566–85, 4 figs. [168 refs.]

SILVESTRONI, E. & BIANCO, I. Frequenza della microcitemia in altri tre paesi del Delta Padano: Formignana, Serravalle, Cologna. **[Incidence of Microcytaemia in Three Regions in the Po Valley: Formignana, Serravalle and Cologna]** *Igiene e San. Pubblica.* Rome. 1959, Mar.–Apr., v. 15, No. 2, 121–5.

See also this *Bulletin*, 1957, v. 54, 1228.

Olesen, E. B., Olesen, K., Livingstone, F. B., Cohen, F., Zuelzer, W. W., Robinson, A. R. & Neel, J. V. **Thalassaemia in Liberia.** *Brit. Med. J.* 1959, May 30, 1385–7, 3 figs. [13 refs.]

2 children with severe intractable anaemia, for which splenectomy had been performed, were studied in south-eastern Liberia. In one case no family studies were possible, but there could be little doubt of the diagnosis of the thalassaemia major. In the second case clinico-pathological information was very scanty, but investigation of the child's relations revealed some interesting possibilities. The blood of the father was characterized by marked leptocytosis, target cells, and ovalocytosis; the haemoglobin contained 42–46% of an alkali-resistant component, but it was impossible to determine whether the A2 fraction was increased. The mother, mildly anaemic, with minimal cytological changes in the red cells and no elevation of Hb F, showed 5·5% of Hb A2. All 3 sibs of the propositus showed pronounced changes in the blood film, similar to those in the father's; in 2 the Hb could not be examined, but in 1 there was anaemia with 34·5% of Hb F. One of the father's brothers showed 5·19% of Hb A2 but was otherwise normal.

Although the authors conclude that both the mother and father had thalassaemia minor, they incline to the view that this is insufficient to explain the remarkably high percentage of Hb F in the father, and the explanation that they favour is that the father possessed two abnormal genes, determining respectively a high A2 and a high F fraction. The affected son might owe his disease to a "combination of a single thalassaemia gene inherited from his mother and a single 'high foetal plus erythrocyte abnormalities' gene inherited from his father".

Subsequently, a survey of 98 Liberian Hb specimens showed 11 with an increased amount of Hb A2. The thalassaemia gene, or one like it, therefore appears to be common in Liberia. It is known that genes responsible for an asymptomatic elevation of Hb F occur in people of African stock [see also this *Bulletin*, 1958, v. 55, 1162]. Thus the investigation of families like the above may be expected to contribute to the analysis of what must still be referred to as the thalassaemia gene-complex, because it offers an opportunity to study separately the inheritance of such characters as cytological erythrocyte abnormalities, and high Hb A2 and high Hb F production. *Alan B. Raper*

Pearson, H. A., Gerald, P. S. & Diamond, L. K. **Thalassemia Intermedia due to Interaction of Lepore Trait with Thalassemia Trait. Report of Three Cases.** *J. Dis. Children.* Chicago. 1959, Apr., v. 97, No. 4, 464–72, 8 figs. [14 refs.]

3 patients with thalassaemia of intermediate severity are described, and it was shown that their condition was due to the interaction between one gene for classical thalassaemia, and one other for an abnormal haemoglobin trait. The Lepore trait is characterized by an erythrocyte morphology similar to that seen in thalassaemia, and by the presence of an abnormal haemoglobin, the Lepore haemoglobin. This pigment is present at the low concentration of, approximately, 10% of total pigment, and has therefore only been demonstrated by starch block electrophoretic technique. *H. Lehmann*

LAURENT, G., DEPIEDS, R., BORGOMANO, M. & DERRIEN, Y. Étude de l'hétérogénéité de l'hemoglobine humaine de type foetal par électrochromatographie sur gélose, et chromatographie sur résine échangeuse de cations. [**Study of the Heterogenicity of Human Haemoglobin of Foetal Type by Electrochromatography on Agar and Chromatography on Cation Exchange Resin**] *C.R. Soc. Biol.* 1959, v. 153, No. 1, 135–7, 2 figs.

DEPIEDS, R., BOFFA, G., LAURENT, G. & BOFFA, M. C. Détection par électrochromatographie en gélose de l'hémoglobine S chez les nouveau-nés porteurs de la tare sicklémique. [**Detection by Electrochromatography on Agar, of Haemoglobin S in Newborn Infants carrying the Sickling Trait**] *C.R. Soc. Biol.* 1959, v. 153, No. 1, 132–4, 2 figs.

BECQUET, R., GASTEAU, T. & HAPPI, C. Note préliminaire sur la drépanocytose en Pays Bamiléké (Cameroun). [**Preliminary Note on Sickling in the Bamileke Country (French Cameroons)**] *Bull. Soc. Path. Exot.* 1958, July–Aug., v. 51, No. 4, 544–7.

In the area surveyed the Bamileke tribe has been long established and subject to very little infiltration by neighbouring tribes. The blood of 543 subjects, adults and children, was tested by exposure to sodium metabisulphite, and in 45 cases (8·3%) was positive for sickling. This is a lower percentage than that recorded for other inhabitants of the country—15·22% by EVANS [this *Bulletin*, 1944, v. 41, 505]; and 24% by LANGUILLON [*Ibid.*, 1958, v. 55, 568]. No ecological details are given in explanation. *Alan B. Raper*

FERGUSON, Angella D. & SCOTT, R. B. **Studies in Sickle-Cell Anemia. XII. Further Studies on Hepatic Function in Sickle-Cell Anemia.** *J. Dis. Children.* Chicago. 1959, Apr., v. 97, No. 4, 418–25, 4 figs. [19 refs.]

This paper deals with the difficulty in establishing the presence of liver damage in children with sickle-cell anaemia. Despite clinical evidence of liver involvement in children with sickle-cell anaemia, it is not often easy to give quantitative data by the usual laboratory tests. The authors have used what they consider the traditional liver function tests, which include palpation of the liver to find out whether it is enlarged, measurement of serum bilirubin (direct and indirect), total serum protein and cholesterol, cephalin flocculation, alkaline phosphatase in the serum, and urobilinogen in urine and stools. Lastly, they also measured the level of serum glutamic oxaloacetic transaminase.

Their range of findings extended from that found in normal children to significantly pathological values. *E.g.* the normal range of serum glutamic oxaloacetic transminase is from 5 to 40 units; in 20 patients the mean was 42 units, and the range from 20 to 70. The normal level of serum albumin varies from 4·5 to 5·5 gm. per 100 ml. In 25 patients the mean level was 4·55, and the range 2·7 to 5·4.

In addition to these traditional tests, the authors used serum protein electrophoresis, determination of the level of venous blood ammonia, analysis of

urinary amino-acid excretion, and histological examination of liver biopsy specimens. Electrophoresis showed that of 28 children with sickle-cell anaemia, 14 exhibited a raised gamma globulin fraction, and 4 an increase in beta globulin. 51 blood ammonia determinations were made on 26 patients with sickle-cell anaemia, and the same test was done on 28 non-anaemic children who were used as controls. In this control group, the ammonia levels varied from 28 to 92 μgm. per 100 ml. of blood. In sickle-cell anaemia patients studied during a quiescent period, values ranged from 31 μgm. to 104 μgm. In 4 patients with crises, with an associated mild respiratory infection, the values ranged from 20 μgm. to 97 μgm. and in 1 patient where crisis was associated with frank pneumonia, the value was as high as 127 μgm. No unusual or abnormal amino-acids were found in the urine of 5 children with sickle-cell anaemia.

Of considerable use was the morphological examination of the liver tissue. It seems that only one specimen was obtained *in vivo*, but that the authors have examined a series of specimens post mortem. Liver biopsy is not recommended as a routine test, but the histological study of hepatic tissue may be helpful in establishing a definite diagnosis, and in excluding other causes of hepatomegaly.

[For abstracts of earlier studies, see this *Bulletin*, 1956, v. 53, 923; 1957, v. 54, 341.] *H. Lehmann*

BERMAN, L. B. & TUBLIN, I. **The Nephropathies of Sickle-Cell Disease.** *Arch. Intern. Med.* 1959, Apr., v. 103, No. 4, 4 figs.

"A 9-year old Negro boy with sickle-cell disease was demonstrated to have the nephrotic syndrome. There were in addition multiple glomerular lesions, pyelonephritis, a vasopressin-resistant concentrating defect, and gross hematuria (by history). Corticotrophin (ACTH) administration was without significant effect."

JONSSON, U., ROATH, O. S. & KIRKPATRICK, Charlotte I. F. **Nutritional Megaloblastic Anemia associated with Sickle Cell States.** *Blood.* 1959, May, v. 14, No. 5, 535-47, 6 figs. [32 refs.]

"Three patients with megaloblastic anemia complicating sickle cell anemia or sickle cell hemoglobin C disease are reported. Previously reported cases of megaloblastic anemia in patients with pre-existing hemolytic anemia are reviewed. It is concluded that the megaloblastic blood formation in such patients may be due to excessive need for folic acid or vitamin B_{12}."

LEHMANN, H. & NWOKOLO, C. **The River Niger as a Barrier in the Spread Eastwards of Haemoglobin C: a Survey of Haemoglobins in the Ibo.** [Correspondence.] *Nature.* 1959, June 6, v. 183, 1587–8, 1 fig.

The frequency of the AC genotype in Yorubas in the Lagos-Ibadan region of Western Nigeria is about 7% [this *Bulletin*, 1957, v. 54, 211, 1231]. No AC persons have been detected in the related Igalla people east of the Niger;

Hb C is absent or rare, and Hb S common, in north-eastern Nigeria and adjacent French territories.

The authors now present the results of examining 257 Ibos, all (except 4) living near Enugu in south-eastern Nigeria. They found 25% of AS genotype, under 1% of AC, and a single AG person.

They regard the differences in Hb C frequency in peoples to the west and east of the lower Niger respectively as an expression of an intermixture of invaders from the north with peoples of either high C or low C frequencies. The river is accepted as a dividing line, and compared in this respect with the Zambesi on the border of the Hb S territory. *Alan B. Raper*

LAU, F. Y. K. **Pulmonary Infarction and Atrophy of the Spleen associated with Sickle-Cell Hemoglobin C Disease.** *New England J. of Med.* 1959, Apr. 30, v. 260, No. 18, 907–11, 5 figs. [16 refs.]

VENOMS AND ANTIVENENES

MCCREARY, T. & WURZEL, H. **Poisonous Snake Bites. Report of a Case.** *J. Amer. Med. Ass.* 1959, May 16, v. 170, No. 3, 268–72. [17 refs.]

"In a case of rattlesnake bite with survival, afibrinogenemia occurred as a result of the thrombin-like action of the venom. Gastrointestinal bleeding and serum sickness also developed."

MONTGOMERY, J. **Two Cases of Ophthalmoplegia due to Berg Adder Bite.** *Central African J. of Med.* 1959, Apr., v. 5, No. 4, 173–7, 6 figs.

HADAR, H. & GITTER, S. [**The Results of Treatment with Pasteur Antiserum in Cases of Snake Bite (Statistical Survey)**] *Harefuah.* Jerusalem. 1959, May 15, v. 56, No. 10. (In Hebrew 257–60. [11 refs.] English summary 260–61.)

The English summary appended to the paper is as follows:—

"1. A statistical survey of the cases of Vipera xanthina palestinae snake bite in different hospitals in Israel has been made. The survey extends over two periods: the first 1951–1953, prior to the introduction of a specific antiserum against Vipera xanthina palestinae venom; the second 1955–1957, in which a specific antiserum (prepared at the Pasteur Institute in Paris) was available. The survey includes 721 cases of snake bite, 303 in the first period and 418 in the second. 248 of the 418 received treatment with Pasteur antiserum.

"2. The purpose of this study was to investigate whether a change in the case mortality rate and in the course of the illness had occurred after the introduction of the antiserum.

"3. The case fatality rate from snake bite was 2·6% in the second period as compared with 6·3% in the first period. This decrease was found to be statistically significant.

"4. It was observed furthermore that the anemia and edema consequent to snake bite were less in the second period.

"5. The treatment of snake bite in the second period differed from the treatment in the first period not only in the use of antiserum, but also in other ways such as the administration of steroids and adrenalin derivatives.

"6. It was concluded that in the second period the course of the illness was less severe than in the first period. It was not possible however to determine what contribution had been made by each individual therapeutic measure.

"7. The dose of antiserum given in the majority of cases was probably not sufficient and also the route of administration was not always the most effective. There is however no certainty that increase of dose or change of route of administration of this antiserum will improve the results of therapy.

"8. The conditions prevailing in Israel are favourable for the antiserum treatment of snake bite patients, as about 90% of patients are admitted to hospital and first aid centers within two hours of the bite. Preparation of antisera of greater effectivity seems therefore of great importance.

"9. A new antiserum has recently been prepared in the Pasteur Institute in Paris according to methods developed in the Beilinson Hospital Medical Research Institute. This antiserum contains antineurotoxic antibodies in addition to antihemorrhagins, and protects mice against higher doses of venom than the previous antiserum."

PROTTI, P. Attività antienzimatica di alcuni veleni di viperidi. [**Anti-Enzymatic Action of Certain Viper Venoms**] *Arch. Ital. Sci. Med. Trop.* 1959, Apr., v. 40, No. 4, 217–22.

The English summary appended to the paper is as follows:—

"In his experiments the author has investigated and put in evidence an antiglycolytic action of the Viperidae family poison. Both the poison of individuals belonging to the crotalidae family (a mixture of Lachesis poisons) and that of the viperdae (poison of Vipera aspis) can block, albeit partially, the fermentation process within the first 24 hours.

"It seems probable that the action of the poisons tested is related to the thiolytic groups."

ADAM, K. R. & WEISS, C. **Distribution of 5-Hydroxytryptamine in Scorpion Venoms.** [Correspondence.] *Nature.* 1959, May 16, v. 183, 1398–9, 2 figs.

PAMPIGLIONE, S. Il latrodectismo nella zona di Cerveteri. [**Biting by** *Latrodectus* **in the Cerveteri Area, Italy**] *Nuovi Ann. d'Igiene e Microbiol.* 1958, Sept.–Oct., v. 9, No. 5, 412–22, 1 map. [17 refs.] English summary (3 lines).

In middle Italy, the spider *Latrodectus tredecimguttatus* occurs all along the coastline of the Tyrrhenian Sea. The author gives 4 case histories of people

bitten by this spider in the commune of Cerveteri, a little to the north of Rome, and quotes from records of sufferers from spider bites, in the vicinity, during the past 25 years. The case histories include the usual pains, cramps and sweating described by earlier observers (*e.g.* for the American " black widow " spider). The records of over 40 previous bites are mostly for summer months (especially July), the sufferers being mainly agricultural labourers (34 men to 9 women). They were usually bitten on the legs or arms, in the arms apparently while picking up sheaves of corn or hay. [There is no mention of bites of people in privies, a common source of bites in parts of U.S.A.] Included in the list are two cases of " tarantulism " or sufferers from the bites of *Lycosa tarantula* [whose effects, however, have been grossly exaggerated and appertain largely to folklore]. *J. R. Busvine*

BETTINI, S. & CANTORE, G. P. Quadro clinico del latrodectismo. [**Clinical Features of Arachnidism due to** *Latrodectus*] *Riv. di Parassit.* Rome. 1959, Mar., v. 20, No. 1, 49–72. [94 refs.]

TOXOPLASMOSIS

POLMAN, A. [Edited by.] **Toxoplasmosis in the Netherlands.** *Trop. & Geograph. Med.* Amsterdam. 1959, Mar., v. 11, No. 1, 13–23, 2 figs. [28 refs.]

This paper is largely a summary of investigations on toxoplasmosis carried out by a number of workers in the Netherlands between 1950 and 1955, most of which have been described previously. Mrs. MAS-BAKAL examined the question of the specificity of the dye test by inoculating rabbits with various vaccines (TAB, cholera, BCG), viruses (vaccinia, poliomyelitis, etc.) and bacteria (*Shigella*); also with *Trypanosoma cruzi* and *Trichomonas vaginalis*. None of the sera gave a positive reaction. The following groups of people gave positive dye tests:—

	Titre of 1/128	Titre of 1/64
106 slaughterhouse workers	1	1
169 aged people in a home	4	7
159 pigeon fanciers	3	1
101 new-born babies	2	2
32 mothers of stillborn babies	1	2
35 microcephalic patients	1	0
500 normal children	0	1
70 ophthalmic patients	1	0

(Of 5,913 human sera 5% were positive, including 97 congenital cases.)

Toxoplasma was isolated from 2 dogs (in brain) and 5 cats (in brains, glands, mammae, marrow, heart and mucosa of cheek) from houses where human

cases of the disease had occurred. A variety of domestic animals showed positive dye tests, but horses, wild rats, parakeets, hares and mice were always negative.

P. C. C. Garnham

RAWAL, B. D. **Toxoplasmosis in Sheep in England.** *Lancet.* 1959, Apr. 25, 881–2. [11 refs.]

The dye test was performed on the inactivated sera of 100 pigs and 100 sheep (from the Sheffield abattoir), and 12 of the former and 11 of the latter were found to react at a titre of 1 in 4 or higher, but only 3 of the sheep samples gave a reaction as high as 1 in 64, and none of the pig sera.

A further 100 specimens were examined from sheep and these showed a 21% incidence. Portions of the brains of these positive animals were homogenized in saline and were inoculated into mice. 11 brains produced neither antibodies nor cysts in the mice; 4 gave rise to low-titre antibodies but no cysts; 6 produced a high dye test and cysts in the brain of the mice (up to an estimated number of 2,800). These strains proved to be relatively avirulent in mice, unless the animals were given cortisone, when acute infections followed; the organisms grew well on the chorioallantoic membranes of eggs but did not kill the embryo chick.

In spite of these findings, the author concludes that the consumption even of undercooked mutton plays little part in the transmission of human infections, because the incidence is similar in vegetarians and meateaters [this *Bulletin*, 1959, v. 56, 766].

P. C. C. Garnham

ORIO, J., DEPOUX, R., RAVISSE, P. & CASSARD, H. Contribution à l'étude de la toxoplasmose en Afrique Équatoriale. Enquête dans la population animale. [**Survey of Toxoplasmosis in Animals in Equatorial Africa**] *Bull. Soc. Path. Exot.* 1958, July–Aug., v. 51, No. 4, 607–15. [11 refs.]

The following animals were tested in Brazzaville for the presence of *Toxoplasma gondii* by inoculation of organs or other material into white mice. Up to three blind passages were performed to detect the organism.

Toxoplasma was isolated from 7 out of 31 adult guineapigs; the animals were cachectic and paralysed.

Toxoplasma was isolated from 8 out of 14 rabbits (5 young and 3 adult); the young animals died of an ascending paralysis, preceded by disequilibrium, the adults after a more chronic, cachectic illness, accompanied by gross splenomegaly.

Toxoplasma was isolated from 1 out of 4 dogs. The dog—a German sheepdog—was malnourished, febrile and had skin lesions. In thick drops of blood the organism was seen and was subsequently isolated by inoculation into mice. The dog was cured with Aureomycin (1 gm. daily for 5 days) and sulphadiazine (1 gm. daily for 7 days). A bitch from the same kennels was observed to have similar lesions and had produced several stillborn litters of puppies; its blood was inoculated into guineapigs which developed toxoplasmosis. The complement-fixation reaction was positive in 19 out of 57 dogs from Poto-Poto and Bacongo. No isolations could be obtained from ticks collected off the dogs.

Toxoplasma was not found in 50 *Rattus rattus*, 8 *R. coucha*, 18 *Cercopithecus* (*cephus* and *nictitans*), 50 fruit bats (*Eidolon helvum*) and 28 insectivorous bats (*Choerophon limbatus*) and a number of other animals.

P. C. C. Garnham

DESMONTS, G. & LE TAN VINH, with the collaboration of L. COUSIN. L'isolement du toxoplasme par inoculation à l'animal. [**Isolation of** *Toxoplasma* **by Animal Inoculation**] *Rev. Française Études Clin. et Biol.* Paris. 1957, June, v. 2, No. 6, 555–65, 5 figs. [18 refs.]

The use of laboratory animals in the diagnosis of toxoplasmosis is fraught with danger because of the occasional presence of the infection within them; thus 6 guineapigs (10% of a group) were found to have a positive complement-fixation reaction, and the organs of 5 of them gave rise to the disease when inoculated into mice. The existence of the infection can be detected by (1) seeing the organism in the tissues—but this usually means killing the animal and anyhow may be unsuccessful, (2) inoculation of suspensions of organs into a series of animals even up to 10 passages, (3) examining the sera for immunological evidence of infection, (4) challenging with a virulent strain to see if the animal is resistant because of previous infection with a non-virulent strain. The third test is the most convenient, but it does not eliminate the existence of very recent or very old infections.

The selection of suitable animals in experimental work on toxoplasmosis then proceeds as follows:—white mice are chosen because the spontaneous disease is rare in them; their age should be about 3 months; the dye test must be negative. The mice are then inoculated with suspensions of organs from the suspect case; the peritoneal fluid is examined from the 5th to 10th day, the serum is tested from the 20th to 45th day, and the brains of " positive " mice are examined for cysts and by inoculation.

Using this technique, the author isolated 14 human strains, 5 from brains of patients with congenital disease, 7 from lymph glands of patients with acquired disease, and 2 from muscle (skeletal and heart). The inoculation of cerebrospinal fluid, blood, marrow, liver and saliva never gave rise to a positive result.

P. C. C. Garnham

HOGAN, M. J. Toxoplasmose ocular. [**Ocular Toxoplasmosis**] *Ophthalm. Ibero Americana.* 1958, v. 20, No. 2, 145–84, 12 figs. on 8 pls. [44 refs.] [Appears also in English in *Trans. Amer. Acad. Ophthalm. & Amer. J. Ophthalm.*]

After an interesting introduction dealing with toxoplasmosis as a whole, the author discusses the clinical manifestations with particular reference to ocular lesions in the acquired and congenital forms of the disease. 36 cases of the latter are described, and it is noted that the most common eye complaint was strabismus. Chorioretinal lesions were observed in both eyes in 25 children. 19 of the patients had a positive dye test at a titre above 1 in 128, and in one-third there were relapses of the eye conditions in later life. Details are given of a further 4 patients who relapsed many years later and in one of them the organism was recovered from the eye 20 years after birth. Good illustrations of the pathological findings accompany these records.

Surveys on uveitis patients were made since 1947 in California with reference to the dye test (35% positive at a titre of 1 in 16 or above, compared with 25% in the normal population, but 50% positive in patients with chorioretinitis) and the skin test (23% positive as compared with 18% in the normal population). 5 of these acquired cases are reported in detail, 2 of which were associated with high fever and involvement of the lungs.

The usual chemotherapeutic agents proved to be of little value in the treatment of ocular lesions. *P. C. C. Garnham*

DERMATOLOGY AND FUNGUS DISEASES

CLARKE, G. H. V. **Skin Diseases in the African.**

This book was reviewed on p. 903.

HEULS, J. & ORIO, J. Premier cas de chromoblastomycose en Afrique Équatoriale Française avec isolement de la souche. [**First Case of Chromoblastomycosis in French Equatorial Africa, with Isolation of the Strain**] *Bull. Soc. Path. Exot.* 1958, Nov.–Dec., v. 51, No. 6, 887–91, 6 figs. on pl.

The organism was identified as *Phialophora pedrosoi.*

MARTIN DE MIRANDOL, P., SEGRETAIN, G. & BATAILLARD. Un cas de chromoblastomycose à la Réunion. [**A Case of Chromoblastomycosis in Réunion**] *Bull. Soc. Path. Exot.* 1958, Nov.–Dec., v. 51, No. 6, 884–7, 1 fig. on pl.

The organism was identified as *Phialophora pedrosoi.*

NOVALES, J Cromomicosis. Estudio de un caso. [**A Case of Chromomycosis in Mexico**] *Dermatología.* Mexico. 1958, Dec., v. 2, Nos. 1/4, 30–36, 6 figs. [17 refs.]

The English summary appended to the paper is as follows:—

"This paper deals with a general description of Chromomycosis in Mexico. A new case is reported and emphasis is made on fair results of treatment by diamino-diphenil-sulfone."

VANBREUSEGHEM, R. Épidémiologie et thérapeutique des pieds de Madura au Congo Belge. [**Epidemiology and Treatment of Madura Foot in the Belgian Congo**] *Bull. Soc. Path. Exot.* 1958, Sept.–Oct., v. 51, No. 5, 793–814, 2 maps. [37 refs.]

The author in considering 11 cases of Madura foot seen in the Belgian Congo, discusses in detail various aspects of the disease both clinical and epidemiological. [An interesting paper which should be read in the original.]

Peter Abbott

SEGRETAIN, G. & MARIAT, F., with the technical collaboration of J. SATRE. Contribution à l'étude de la mycologie et de la bactériologie des mycétomes du Tchad et de la Côte des Somalis. [**Mycological and Bacteriological Studies of Mycetomas in Tchad and in the Somali Coast**] *Bull. Soc. Path. Exot.* 1958, Sept.–Oct., v. 51, No. 5, 833–62, 1 text fig. & 16 figs. on 4 pls. [29 refs.]

The authors present a detailed study of the grains, the cultures obtained therefrom and tissue sections from 34 patients with Madura foot: 22 from Fort Lamy in French Equatorial Africa and 12 from Djibouti in French Somaliland. Of these cases 15 were maduromycoses and 19 actinomycoses.

A wealth of descriptive detail of the organisms isolated—*Madurella mycetomi*, a *Madurella* sp., *Streptomyces madurae*, *Streptomyces pelletieri* and *Streptomyces somaliensis*—and of their appearance in the grain and in tissue sections, is supported by excellent photographic plates. This cannot be abstracted but will prove extremely valuable for reference. In addition, the authors add some interesting observations on the distribution in Africa of the different causative fungi of mycetoma and a useful summary of the characteristics of the grains and sections which can be used to identify the species without culture. This will become of increasing importance as specific agents are used in the treatment of the different infections.

[This is an important paper which should be read in the original.]

Peter Abbott

DESTOMBES, P., CAMAIN, R. & NAZIMOFF, O. Anatomie pathologique des mycétomes et du pied de Madura en particulier. [**Pathological Anatomy of Mycetomas especially Madura Foot**] *Bull. Soc. Path. Exot.* 1958, Sept.–Oct., v. 51, No. 5, 864–76, 8 figs. on 4 pls. & 3 diagrams.

This detailed and important paper, based on a study of more than 160 specimens of mycetoma from the French territories in Africa, describes the histological picture of the inflammatory reaction to infection by *Streptomyces somaliensis, S. pelletieri, S. madurae* and *Madurella mycetomi*. It discusses the effects of this reaction on the parasite and on the host and in describing the involvement of the different structures, it pays particular attention to the results of invasion of the bones. Some noteworthy conclusions from the material studied are:—

1. All the agents causing mycetoma are osteophilic.
2. The histological picture of the grain is specific to each organism. Identification of the causative organism can be made from this picture.
3. The inflammatory response to infection is never able to overcome or sterilize the infection.
4. The invasion of lymphatic glands spontaneously is rare but is more frequent after an amputation which is too limited in extent.
5. The lesions in bone are characteristic of the invading species; the X-ray appearance may indicate the species involved.

Peter Abbott

ANDRÉ, M. Aspects cliniques et chirurgie des mycétomes. [**Clinical and Surgical Aspects of Mycetoma**] *Bull. Soc. Path. Exot.* 1958, Sept.–Oct., v. 51, No. 5, 817–32, 6 figs. 6 on 3 pls. & 2 maps.

25 cases of Madura foot seen in the Tchad area of French Equatorial Africa are described with particular emphasis on the pathology and development, the clinical forms and the surgical treatment. The causative organisms were *Madurella mycetomi* (7), *Madurella* sp. (2), *Streptomyces madurae* (5), *Streptomyces pelletieri* (6), *Streptomyces somaliensis* (3) and unidentified (2). The radiological appearances are made clear in 4 good photographs.

Peter Abbott

HAUG, W. A. & MERRIFIELD, R. C. **Coccidioidal Villous Synovitis. Report of a Case and Consideration of the Literature.** *Amer. J. Clin. Path.* 1959, Feb., v. 31, No. 2, 165–71, 7 figs.

A case of granulomatous villous synovitis of the knee is described. At operation, the resected tissue was grossly villonodular in appearance and *Coccidioides immitis* was demonstrated both histologically and by culture. 4 similar cases from the literature are reviewed. *Peter Abbott*

COLWELL, J. A. **Remission in Disseminated Coccidioidomycosis produced by Amphotericin B.** *Ann. Intern. Med.* 1959, Apr., v. 50, No. 4, 1028–35, 1 fig. [18 refs.]

"1. Amphotericin B produced a remission in a case of disseminated coccidioidomycosis. Evidence of effectiveness was a temporary improvement after one month of treatment, followed by a relapse which was responsive to 28 weeks of intravenous therapy.

"2. Toxic effects of the drug were confined to temporary elevation of the blood urea nitrogen and occasional casts in the urine. No permanent renal damage developed. There was no evidence of a toxic effect on the liver or bone marrow.

"3. The experience in the present case and a review of the literature to date suggest that adequate doses of amphotericin B (at least 1 mg. per kilogram intravenously) must be administered for a prolonged period of time to achieve a remission in disseminated coccidioidomycosis."

TROPICAL OPHTHALMOLOGY

RADNOT, M. Lutte antitrachomateuse en Hongrie. [**Antitrachomatous Campaign in Hungary**] *Rev. Internat. du Trachome.* 1959, v. 36, No. 2, 167–73, 1 map.

"In 1956, 10,758 cases of trachoma were numbered in Hungary, after a survey of the third of the population.

"After one year of free treatment, it improved to 6·954, out of which 3·841 were new cases.

"A report of prophylaxis in schools and plants, and of treatment (especially non-mechanical and 'Tetran', Hungarian terramycin) is given."

MISCELLANEOUS DISEASES

D'ABRERA, V. St. E. **Tropical Eosinophilia. An Aetio-Pathological Study.** *Proc. Alumni Ass., Malaya.* 1959, Mar., v. 12, No. 1, 31–50, 12 figs.

The caption " How shall we find the concord of this discord? " forms a most appropriate quotation for the subject-matter of this study which was undertaken partly for a thesis for the Doctorate in Medicine of the University of Malaya. In it the author has summarized the most important researches (and their name is legion) which have been devoted to this contentious subject.

In 1958 he suggested that if a change of name should become necessary the term " parasitic bronchitis " should be adopted. Tropical eosinophilia, as he sees it, is a syndrome in which the respiratory system is primarily involved and the prominent features which characterize it are cough (with or without) asthma, eosinophilia, radiological mottling of the lungs and therapeutic response to organic arsenical and piperazine compounds. Less common accompaniments are low-grade fever, haemoptysis, lymphadenopathy, hepatomegaly, urticaria, and, after treatment, liability to Herxheimer reactions. The lower limits of eosinophilia appear to be purely arbitrary. Some inexplicable anomalies have been encountered after specific treatment, for some eosinophilias are not affected by it. Very often systems other than the respiratory are involved, such cases resembling rheumatic heart disease and rheumatic fever, but responding, nevertheless, to specific therapy with arsenicals.

Although a variety of agents, mainly parasites, have been incriminated, the aetiology of the disease remains unknown. The morbid anatomy is even more obscure, and so far only two cases studied at autopsy have been reported in the literature. Most authors have worked on the assumption that the syndrome could be caused by one agent alone and many believe that it is an allergy and that the allergen is provided by a parasite.

The following parasites have been incriminated:—*Ascaris lumbricoides*, *Toxacara canis*, *Necator americanus*, *Strongyloides stercoralis*, *Ancylostoma caninum*, *filariae* sp.—*Wuchereria bancrofti*, *malayi*, *loa*, *Fasciola hepatica*, *Schistosoma mansoni*, *Clonorchis sinensis*, mites, *Trichinella spiralis*, *Entamoeba histolytica* and *Histoplasma capsulatum*.

In the 7 autopsies recorded in this series the common findings were necrotizing bronchiolitis, the plugging of the alveoli with red cells and haemosiderin-containing macrophages and the heavy eosinophilic infiltration of the lung parenchyma. One case showed granulomata containing typical giant cells and remains of disintegrating helminths. In another case, the lungs showed only oedema.

It is suggested that there is really no difference between tropical eosinophilia and Löffler's syndrome, except that the former occurs in the tropics and the latter is limited to the mid-latitude zones. Löffler's syndrome has also been attributed to *Myco. tuberculosis*, numerous pollens, *Entamoeba histolytica*, larvae of ascaris and other migratory helminths. Cases are on record in which neither arsenic nor diethylcarbamazine has any influence on the disease. In Löffler's syndrome the condition very rarely responds to arsenic, and spontaneous recovery is more the rule than the exception.

[All the arguments commented upon have been reviewed from time to time in this *Bulletin*.]

Philip Manson-Bahr

D'Abrera, V. St. E. **Some perplexing Paradoxes in Tropical Eosinophilia.** *Med. J. Australia.* 1959, Apr. 18, v. 1, No. 16, 517–20. [21 refs.]

A discussion on the origin, aetiology, mechanism and racial incidence of the syndrome with emphasis on some paradoxical features.

Danaraj, T. J. **Pathologic Studies in Eosinophilic Lung. (Tropical Eosinophilia.) Case Reports.** *Arch. Pathology.* 1959, May, v. 67, No. 5, 515–24, 8 figs. [31 refs.]

" A complete pathologic study of an adult Ceylonese man who died of encephalopathy following treatment of eosinophilic lung with neoarsphenamine is reported. The significant histologic finding was the presence of foreign-body granulomas in the lungs. In a series of liver biopsies granulamatous lesions were not found, but there was periportal infiltration with leukocytes which was considered to be nonspecific. Similar changes were found in liver biopsy specimens from cases of filariasis. Lymph node biopsy specimens did not reveal any significant abnormality."

Schrire, V. **Myocardial Infarction—the Comparative Racial Prevalence in Cape Town, 1957—an Electrocardiographic Study.** *Postgraduate Med. J.* 1959, Apr., v. 35, No. 402, 218–22.

" Electrocardiograms of 3,525 adults attending the Groote Schuur Hospital and the New Somerset Hospital, Cape Town, during 1957 were analysed to determine the inter-racial prevalence of myocardial infarction.

" Electrocardiographic evidence of myocardial infarction was found in only one Bantu during 1957 and this patient had been seen before in previous years.

" Electrocardiographic evidence of myocardial infarction and ischaemic heart disease was found far more commonly in the White than in the Cape Coloured, in both of whom the disease was common.

" The higher prevalence of ischaemic heart disease in Whites than in non-Whites was confirmed and was not attributable to a significant difference in age distribution of the population studied.

" The peak prevalence in males was between 50 and 59 and in females between 60 and 69. The disproportionate prevalence in males was confirmed.

The results were compared with the findings of previous years."

Oettlé, A. G. & Higginson, J. **The Incidence of Primary Carcinoma of the Liver in the Southern Bantu. II. Preliminary Report on Incidence in Johannesburg.** Reprinted from *J. Nat. Cancer Inst.* 1956, Sept., v. 17, No. 3, 281–7.

Higginson, J. & Oettlé, A. G. **The Incidence of Liver Cancer in South Africa. Part III.** Reprinted from *Acta Union Internat. Contre Cancer.* 1957, v. 13, Nos. 4/5, 602–4, 1 fig. [54 refs.]

From the cancer registry set up at the South African Institute for Medical Research the authors have made estimates of cancer incidence among the

Bantu living in the Johannesburg townships in the years 1953 and 1954. Earlier workers, basing their studies on hospital data only, have described liver carcinoma as a disease of young adults. The present authors, however, show that although primary tumours at this site occur early in life and form as much as 50% of all carcinomas in men under 45 years of age, the incidence rates based on a known population at risk rise steadily with age. The incidence was higher in men than in women, but the sex-ratio which was about 6·1 below 45 years of age fell to below 2·1 above this age.

It is estimated by a method of standardization that the incidence of liver cancer in the Johannesburg study was about 50 to 100 times greater than that in Denmark and 5 to 10 times greater than that in the United States.

J. Knowelden

PARASITOLOGY: GENERAL

MACKERRAS, M. Josephine. **Catalogue of Australian Mammals and their Recorded Internal Parasites. I–IV. Part I. Monotremes and Marsupials.** Reprinted from *Proc. Linnean Soc. of New South Wales.* 1958, v. 83, Pt. 2, 101–25. [138 refs.] **Part II. Eutheria.** *Ibid.,* 126–43. [113 refs.] **Part III. Introduced Herbivora and the Domestic Pig.** *Ibid.,* 143–53. [129 refs.] **Part IV. Man.** *Ibid.,* 153–60. [114 refs.]

The author has collected all relevant information regarding the incidence of internal parasites (protozoa, helminths and pentastomids) in the Australian mammals, and gives four useful lists, in (1) the monotremes and marsupials, (2) the Eutheria, including some introduced species such as rabbits, dogs and cats, (3) the introduced herbivores and pig, and (4) man.

The first group is of particular interest to parasitologists, as it is peculiarly Australasian and a complete bibliography has been attempted; trypanosomes, haemogregarines and piroplasms occur, but no malaria parasites, and there are remarkable trematodes, cestodes and strongylids. Among the third group are 6 mammals with parasites (cattle with piroplasms, various flagellates, flukes, hydatids and nematodes, sheep and cattle with trypanosomes, coccidia and various helminths, horse with cestodes and strongylids, and camels and pigs with various helminths).

The incidence of parasites in man is briefly discussed. It is thought that malaria parasites were introduced from the north (*Plasmodium ovale* is apparently absent); filarial parasites were also probably imported. These two infections are disappearing rapidly: likewise the ankylostomes, but hydatid disease remains a great problem. The schistosomes have never become established.

P. C. C. Garnham

ACHARYA, P. T., AMIN, S. P. & SAYED, B. A. **Comparative Evaluation of Concentration Methods for the Detection of Cysts and Ova in Faeces.** *J. Indian Med. Ass.* 1959, Apr. 16, v. 32, No. 8, 322–4.

" A series of 400 samples of faeces were examined for protozoal cysts and helminthic ova.

"Each faecal sample was examined by (a) direct wet preparation technique, (b) acid-ether concentration technique, (c) zinc sulphate concentration technique and (d) brine flotation technique.

"Zinc sulphate method was the best for concentrating the protozoal cysts. Brine flotation method was the best for concentrating the helminthic ova."

WINSLOW, D. J. & HATHAWAY, B. M. **Pulmonary Pneumocystosis and Cryptococcosis. Report of a Case of Mixed Infection in a United States Male Adult.** *Amer. J. Clin. Path.* 1959, Apr., v. 31, No. 4, 337–42, 6 figs. [12 refs.]

"This case of chronic lymphatic leukemia, combined with pulmonary pneumocystosis and cryptococcosis, seems to be the first reported incidence of the association of *Pneumocystis carinii* with *Cryptococcus neoformans*. The patient was a 39-year-old white farmer who lived in Alabama. Factors that are considered as possibly important in the pathogenesis of his mixed infection are (1) the leukemia, (2) the patient's occupation as a farmer, and (3) the treatment, which included Meticorten, chemotherapy, and irradiation."

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

SENEVET, G. & ANDARELLI, L. **Les moustiques de l'Afrique du Nord et du Bassin Méditerranéen. Les genres *Culex*, *Uranotaenia*, *Theobaldia*, *Orthopodomyia* et *Mansonia*.** [Mosquitoes of North Africa and the Mediterranean Basin. The Genera *Culex*, *Uranotaenia*, *Theobaldia*, *Orthopodomyia* and *Mansonia*] With a preface by Edmond SERGENT. 383 pp., 79 figs. 1959. Paris VIe: Paul Lechevalier, 12, rue de Tournon.

The anopheline fauna of North Africa and the Mediterranean was described by Senevet and Andarelli in 1956 [this *Bulletin*, 1956, v. 53, 848]. The culicine mosquitoes are to be surveyed in two volumes, of which this is the first to appear, the second volume being devoted to the genus *Aëdes*. Thus the two volumes are to cover about 70 species. Consequently the descriptions of the species in this volume are detailed; the description of *Culex poicilipes*, for instance, and its biology occupy 7 pages. The book is profusely illustrated, although the quality of the illustrations varies somewhat.

In the first part of the volume the general descriptions of the morphology of adult, larva and pupa follow conventional lines, but an account of the female genitalia is included, as well as a key to the genera based on the female genitalia. There is also a table comparing the systems of different authors for labelling the pupal chaetotaxy.

The main part of the work is devoted to a survey of the species belonging to the genera *Culex* (22 species and varieties, plus the *Culex pipiens* complex), *Uranotaenia* (1 species), *Theobaldia* (10 species), *Orthopodomyia* (1 species) and

Mansonia (2 species). In this section keys are given to the adult mosquito, the male hypopygia and the larvae and pupae of most of the species. Each species is described, wherever possible, in all except the egg and early larval stages of the life history. After the specific description, short accounts are given of the geographical distribution, larval habitat, seasonal activity and biting habits.

The main affinities of the mosquito fauna of this area are indicated in the third part of the book, where the species are listed under the countries and islands of the Mediterranean, and also under the other countries of Europe. A few species, *Culex poicilipes*, *C. tritaeniorhynchus*, *C. theileri*, *C. univittatus* and *Theobaldia longiareolata*, are found elsewhere in Africa south of the Sahara. These species, except *C. poicilipes*, also have a wide distribution and, with such species as *C. modestus* and *C. mimeticus*, extend further east. One species, *Theobaldia atlantica*, from the Azores, is related to the American species *T. maccrackenae*. A number of the species recorded here are found, of course, also north of the Mediterranean region.

The bibliography, covering 12 pages, contains nearly 400 references.

B. R. Laurence

TEESDALE, C. **Observations on the Mosquito Fauna of Mombasa.** *Bull. Entom. Res.* 1959, Mar., v. 50, Pt. 1, 191–208, 4 figs. [13 refs.]

Mosquitoes were captured by day-time net catches in the bush, by window traps, by day-time biting catches in the bush and by 24-hour biting catches at tree platforms, 30 and 50 feet above the ground, in houses and in open spaces in the villages. Net catches produced 66 species of mosquito and 9 additional species were captured by the other methods. *Culex fatigans* was found to be the commonest mosquito and was usually captured in window traps and by net out of doors, as well as biting in houses, in the villages, and at 30 and 50 feet in the trees. The periods of greatest abundance were during and after the two rainy seasons, April to May and October to November. Biting catches over 24 hours showed a peak of biting activity after midnight, both indoors and out of doors.

Aëdes simpsoni was found in all months of the year, although scarce in the drier months, January to March. Only 2 females were captured indoors and none were captured in the window traps. Biting catches out of doors confirmed the day-biting habits of this species, which feeds mostly near the ground. *Aëdes pembaensis* was more abundant in the drier months, but was very common biting out of doors and in net catches. This species also causes some biting nuisance in houses, especially in those situated near mangrove swamps. Most biting activity was at night. The behaviour of *Aëdes aegypti* in this part of Africa has been reported elsewhere [this *Bulletin*, 1956, v. 53, 575].

Anopheles gambiae was taken rarely out of doors but was more numerous in window traps, both by day and night. This species appeared suddenly in April, with the onset of the rainy season, continuing until July but then becoming rare until the following April, with a temporary increase in numbers in December, after the second rains. *A. funestus* was scarce, but was captured most frequently in exit window traps.

Notes are given on the behaviour of the other species, but this information should be consulted in the discussion and tables of the original paper [see also *ibid.*, 1959, v. 56, 487].

B. R. Laurence

IRREVERRE, F. & TERZIAN, L. A. **Nitrogen Partition in Excreta of Three Species of Mosquitoes.** *Science.* 1959, May 15, v. 129, 1358–9.

BURCHAM, E. **Artificial Insemination of** *Aedes aegypti* **(L.).** *Canadian Entomologist.* 1957, Nov., v. 89, No. 11, 494–5.

Preliminary results are reported for artificial insemination of *Aëdes aegypti* in which a fine pipette is used to inject into the female vulva a saline suspension of spermatozoa and accessory gland fluid of the male, with special attention to filling the female bursa copulatrix. Females were anaesthetized under CO_2 during the manipulation, held dorsal side downwards by fine pins, but with the abdomen pointing upwards at about 45°C. Of 175 females inseminated, 84 lived to lay. Only 15 females produced fertile eggs, the fertility rate in their 1,129 eggs being 16%. Fertility for individual females ranged from one egg to 70% of her eggs fertile.

Improvement in technique in the saline diluent, and the addition of an antibiotic to the inoculum (0·1 mgm. oxytetracycline per 100 ml. saline increased post-operative survival of females) are thought likely to improve results.

The conveniences of being able to induce insemination of mosquitoes artificially are briefly indicated. *D. S. Bertram*

BAR-ZEEV, M. & SMITH, C. N. **Action of Repellents on Mosquitoes feeding through Treated Membranes or on Treated Blood.** *J. Econom. Entom.* 1959, Apr., v. 52, No. 2, 263–7, 1 fig. [25 refs.]

"A method for testing repellents against *Aedes aegypti* (L.) feeding on citrated blood through an artificial membrane is described. Repellents were applied at various concentrations on the membrane or in the blood, and the concentration required to give 50% repellency was determined. The percentage of mosquitoes that fed was affected by the time between anesthesia by carbon dioxide or cold and feeding. The second factor was not a critical one. When applied on the membrane or in the blood, diethyltoluamide was the strongest repellent, followed by dimethyl phthalate and ethyl hexanediol. Dimethyl phthalate applied on the membrane probably acted as a vapor repellent only. There were indications that blood acted as a vapor stimulant in feeding. Rabbits injected intravenously with diethyltoluamide did not repel the mosquitoes, nor did the blood taken from injected rabbits and offered through a membrane. It was concluded that the repellent was removed from the blood very rapidly."

BAR-ZEEV, M. & SCHMIDT, C. H. **Action of a Repellent as indicated by a Radioactive Tracer.** *J. Econom. Entom.* 1959, Apr., v. 52, No. 2, 268–9.

"P^{32}-phosphoric acid was used as a tracer in experiments with *Aedes aegypti* (L.) feeding through a membrane on citrated blood. When diethyltoluamide was present in the blood at a concentration that prevented the mosquitoes from engorging, the mosquitoes barely touched the membrane and did not insert their proboscises into the blood. When the concentration was lowered to one that allowed about half the mosquitoes to become engorged,

those that did not feed spent slightly more time in contact with the membrane, and about a third of them inserted their proboscises into the blood but did not imbibe. It was concluded that most of the repellency was due to vapor action but at a low concentration contact chemoreceptors on the labella may have been involved."

QUTUBUDDIN, M. **The Inheritance of DDT-Resistance in a Highly Resistant Strain of *Aëdes aegypti* (L.).** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 6, 1109–12.

In experiments with a laboratory-selected strain of DDT-resistant *Aëdes aegypti* from Trinidad (1000 × resistant) the author confirms that resistance is controlled by a single genetic factor. This had been previously demonstrated by COKER (*Inheritance of DDT resistance in Aëdes aegypti (L.)* [Thesis] 1957, London) in unselected DDT-resistant Trinidad *Aëdes aegypti* (120 × resistant).

The LD50 of the F_1 was intermediate between that of the two parents and there was comparatively little overlapping in the 3 regression lines (a difficulty which Coker experienced). A 3 : 1 segregation in the F_2 and a 1 : 1 ratio in the 2 backcrosses were as expected. *R. J. Wood*

FORATTINI, O. P., RABELLO, E. X. & PATTOLI, D. Culicoides da região neotropical (Diptera, Ceratopogonidae). II—Observações sôbre biologia em condições naturais. [*Culicoides* **of the Neotropical Region. II. Observations on Biology in Natural Conditions**] *Arquivos Facul. de Hig. e Saúde Pública Univ. de São Paulo.* 1958, June, v. 12, No. 1, 1–52, 49 figs. [42 refs.] English summary.

An intensive study from August 1955 to July 1957 of *Culicoides* in the vicinity of São Vicente, Brazil, yielded 10 species. *C. insignis* comprised nearly 95% of about 149,000 specimens. It bred in ditches, salt marshes and holes of the crab, *Oedipleura cordata.* This species, *C. maruim, C. guyanensis* and *C. flavivenula* were taken biting man. The first three species were also taken indoors, *C. insignis* being the most common. The paper is profusely illustrated with excellent photographs of breeding places, methods of collection, and the crab species in the burrows of which species of *Culicoides* were breeding. There is a general map of the area and numerous graphs and tabular matter of the incidence of the midges under different conditions of collection.

[See also this *Bulletin,* 1958, v. 55, 1287.] *D. S. Bertram*

GRENIER, P. & GRJÉBINE, A. Remarques morphologiques et biologiques concernant les "mouka-fouhi" (*Simulium neireti* Roubaud, *S. imerinae* Roubaud) de Madagascar et *S. ambositrae* nom. nov. [**Comments on the Morphology and Biology of the "Mouka-Fouhi" (*Simulium neireti* and *S. imerinae*) of Madagascar, and *S. ambositrae* nom. nov.**] *Bull. Soc. Path. Exot.* 1958, Nov.-Dec., v. 51, No. 6, 981–91, 4 figs.

SUZUKI, T., IKESHOJI, T. & SHIRAI, M. **Insecticide Resistance in Several Strains of House Flies in Japan.** *Japanese J. Exper. Med.* 1958, Dec., v. 28, No. 6, 395–403, 1 fig. [20 refs.]

Resistance of p,p[1]-DDT, lindane, dieldrin, Diazinon, malathion, DDVP, allethrin and lethane has been estimated by a topical application technique in adult flies of 5 strains of *Musca domestica vicina*: 4 collected in the field, where they had been variously treated with DDT, dieldrin and lindane; and 1 laboratory colony. The insecticide in acetone was applied with a micro-syringe. Mortality was assessed after 24 hours.

Results suggest that *M. d. vicina* is by nature more tolerant to the chlorinated hydrocarbons than is *M. domestica*. The normal "susceptible" colony (Takatsuki strain), never exposed to insecticide, showed a high resistance to DDT (LD50 > 60 mgm. per fly) [see BUSVINE and HARRISON, this *Bulletin*, 1954, v. 51, 515]. LD50s with other insecticides were: lindane 0·739 mgm. per fly; dieldrin 0·125 mgm. per fly; Diazinon 0·040 mgm. per fly; malathion 0·352 mgm. per fly; DDVP 0·032 mgm. per fly; allethrin 1·031 mgm. per fly; lethane 14·389 mgm. per fly.

All 5 strains were highly or moderately resistant to DDT. A very high level of lindane and dieldrin resistance was shown by two strains. In one other strain, lindane resistance was high but dieldrin resistance low. There seemed to be some correlation between the resistance of a strain to a particular insecticide and the frequency of application of this chemical in the area from which the strain was collected. Resistance to dieldrin is thought to have developed faster than resistance to lindane.

No strains were resistant to lethane, allethrin or the organophosphorus insecticides. *R. J. Wood*

ABEDI, Z. H. **Inheritance of Aldrin Resistance in the Indian House-Fly,** *Musca domestica nebulo* **F.** *Bull. Entom. Res.* 1958, Dec., v. 49, Pt. 4, 637–42.

The genetics of aldrin resistance in *Musca domestica nebulo* has been investigated for the first time. Reciprocal crosses were made between a laboratory raised aldrin-resistant strain and a susceptible colony. These were of two types: those between individual pairs of flies, and mass crosses.

The resistance level of each strain and of the hybrids was measured by a topical application technique. The insecticide in oil solution was applied to the back of the fly with a syringe, and the mortality assessed after 24 hours.

The two types of crosses gave similar results. No sex linkage was shown. The F_1 flies were intermediate in resistance but resembled more closely the resistant parents. The degree of resistance decreased in the F_2 but was still nearer to the resistant parents. The hybrids were somewhat more variable in their susceptibility than the parental stock.

It is concluded that the inheritance of aldrin-resistance in *M. d. nebulo* is multifactorial with no sex linkage. *R. J. Wood*

OVAZZA, M. & VALADE, M. Contribution à l'étude des Tabanidae (Diptera) d'Afrique Occidentale Française. II. Sur deux espèces de *Tabanus*: *T. hamoni* n. sp. et *T. sugens* Wiedemann 1828. [**The Tabanidae of French West Africa. II. Two Species,** *Tabanus hamoni* **n.sp. and** *T. sugens*] *Bull. Soc. Path. Exot.* 1958, Nov.–Dec., v. 51, No. 6, 992–8, 1 fig.

DIAS, J. A. T. S. **Revision of some Ethiopian Tabanids based on the Material in Collection at some Entomological Institutes in Paris and London.** *Anais Inst. Med. Trop.* Lisbon. 1958, Sept., v. 15, No. 3, 711–79.

BUSVINE, J. R. **Insecticide-Resistance in Bed-Bugs.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 6, 1041–52, 1 fig. [17 refs.]

Resistance of bed bugs to DDT and its analogues, and to the dieldrin-BHC group, is widespread.

A simple method for testing the level of resistance is described. Use is made of the insecticide-impregnated paper supplied in the WHO Adult Mosquito Test Kit. The results compare favourably with those of CWILICH *et al.* [this *Bulletin*, 1957, v. 54, 889] in which a laboratory spraying apparatus was used. 15 to 30 bugs per batch were tested 5 days after feeding. Batches were confined in test tubes with a piece of treated paper (about 2 × 5 cm.) folded once. Exposure was for 120 hours at 25°C. Both *Cimex lectularius* and *C. hemipterus* were tested.

From the results "it appears that bed-bugs can develop resistance either to DDT and analogues or to BHC and dieldrin analogues or to both groups simultaneously". The level of resistance in certain strains did not appear to be in accordance with available information on field usage of insecticides. (Similar discrepancies have been reported for house-flies [*ibid.*, 1954, v. 51, 515; 1958, v. 55, 1175].)

Associated with DDT resistance in bed bugs was a cross resistance to methoxychlor, Prolan and Perthane. Moreover, resistance was not overcome by the addition of the synergist DMC [1,1, *bis*-(*p*-chlorphenyl) ethanol]. Hence there is no positive evidence of dehydrochlorination as a detoxification mechanism.

A resistance to pyrethrins of up to 10 times was also associated with DDT resistance [also observed in house-flies, this *Bulletin*, 1953, v. 50, 657]. "The absence of concomitant differences in susceptibility to Lethane 384 suggests that this is not mere vigour tolerance."

The "resistance spectra" of *C. lectularius* for the dieldrin-BHC series is compared with corresponding ones for *Anopheles gambiae* and *Musca domestica*. There are close resemblances between the three, especially between the bed bug and the mosquito. *R. J. Wood*

SMITH, A. **Dieldrin-Resistance in *Cimex hemipterus* Fabricius in the Pare Area of North-East Tanganyika.** *Bull. World Health Organization.* Geneva. 1958, v. 19, No. 6, 1124–5.

During the period November 1955 to January 1957, beds and the interior surfaces of African huts in the Pare area of North-East Tanganyika were treated 3 times (at 8-month intervals) with dieldrin. A water-dispersible powder was used at an approximate dosage of 80 mgm. per square foot (860 mgm. per m^2). Good control of bed bugs was obtained for the first two cycles but local Africans reported that the nuisance recurred at about the same time as the third cycle of treatment.

Laboratory tests by a method similar to that described by BUSVINE [see above] revealed a high level of resistance to dieldrin. *R. J. Wood*

POMERANTZEV, B. J. [**Basis Directions of Evolution of Ixodoidea**] *Parasit. Act. Zool. Inst. Acad. Sci. U.S.S.R.* 1948, v. 10, 5–18. [In Russian.] [Translation 13, Dept. Med. Zool., U.S. Nav. Med. Res. Unit No. 3, Cairo.]

MERIGHI, B. Nuove osservazioni su alcune specie di Ixodidae della fauna italiana. Nota I. [**New Observations on Some Species of Ticks in Italy**] *Nuovi Ann. d'Igiene e Microbiol.* 1959, Mar.–Apr., v. 10, No. 2, 129–32. English summary (2 lines).

COLAS-BELCOUR, J. & MOREL, P. A propos de la présence en Tunisie de l'*Ornithodoros arenicolous* Hoogstraal, 1953. [*O. arenicolous* **in Tunisia**] *Bull. Soc. Path. Exot.* 1958, Nov.–Dec., v. 51, No. 6, 915–17.

TSUTSUMI, C. **A Histological Study of the Development of the Urticating Spicules of the Far Eastern Urticating Moth,** *Euproctis flava* **Bremer (Lepidoptera: Lymantriidae).** *Japanese J. Med. Sci. & Biol.* 1958, Dec., v. 11, No. 6, 443–53, 2 text-figs. & 12 figs. on 2 pls.

UNITED STATES PUB. HEALTH SERVICE. **1959 Report from the Communicable Disease Center. Public Health Pesticides for Mosquitoes, Flies, Fleas, Roaches, Bed Bugs, Ticks, Rodents.** Reprinted from *Pest Control.* 1959, Mar., 11 pp., 1 fig.

This is an annual publication summing up current usage and experience with chemicals for the control of insects, ticks, mites and rodents of public health importance in the United States. An introductory section discusses principles, including means by which resistance to insecticides may be needlessly induced, and emphasizes that chemical control should normally be viewed as supplementary to environmental sanitation.

Mosquitoes, and also house-fly and allied flies, are reported on at some length. Resistance to organophosphorus (malathion and parathion) compounds is now reported for certain culicines and there are similar findings for house-flies (*M. domestica*) in certain areas, including resistance of a behaviouristic nature to malathion-molasses baits.

Other pests reported on more briefly include fleas, cockroach, bed bug, hard ticks and chiggers [*Trombicula*].

The article concludes with indications for the use of warfarin, Pival, Fumarin, Diphacinone, ANTU and sodium monofluoroacetate (1080), the last only by specially trained personnel as it is highly toxic to man, against domestic rodents. *D. S. Bertram*

SOAP. New York. 1959 (Blue Book), 217–18. **Cockroach Spray Test Method. Official Method of the Chemical Specialties Manufacturers Association for evaluating Cockroach Sprays.**

————, 219–20, 258–9. **The Peet-Grady Method. Official Method of the Chemical Specialties Manufacturers Association for evaluating Liquid Household Insecticides, Latest Revision.**

————, 221–2, 261, 1 fig. [11 refs.] **Cockroach Aerosol Test Method. Tentative Method of the Chemical Specialties Manufacturers Association for evaluating Aerosol Cockroach Insecticides.**

————, 223–4. **Aerosol Insecticides Storage Test. Tentative Official Method of the Chemical Specialties Manufacturers Association for Storage of Aerosol Insecticides.**

SIMMONS, S. W. [Edited by.] **DDT. The Insecticide Dichlorodiphenyltrichloroethane and its Significance. Vol. II. Human and Veterinary Medicine.**

This book was reviewed on p. 903.

MISCELLANEOUS PAPERS

AUDY, J. R. **The Localization of Disease with special reference to the Zoonoses.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1958, July, v. 52, No. 4, 308–28, 2 figs. [46 refs.] Discussion 329–34 [GARNHAM, P. C. C.; MANSON-BAHR, P.; BERTRAM, D. S.; KERSHAW, W. E.; MATTINGLY, P. F.; AUDY, J. R. (in reply)].

This important paper brings together the author's observations and theories developed during long experience in Malaya. He wisely devotes a large portion of the paper to an explanation of terms, some of which are the conventional concepts of ecology, while others have been introduced by himself. The essential theory is based on the idea of the "biocenose"—a species network or assembly of living things (animal or vegetable) in a locality; to this can be added the physical environment, and the "ecosystem" is the final product. The ecosystem is more than the simple addition of these various factors—something new has crept in, and a "super-organism" is the result. The vector-borne diseases which have an animal reservoir (*i.e.* zoonoses) provide a beautiful example to demonstrate this theory in action; the Russians were the first to develop it along these lines, in which the doctrine of "nidality" or focal localization forms the essential clue. The paper must be read in full to understand all the implications, of which perhaps the most important is the "dynamic equilibrium" existent between organism and host species in different environments.

The second part of the paper tries to analyse the nature of various problems: (1) the factors involved in the topographical localization of parasites in their

maintaining hosts, (2) the exchange of maintaining hosts, and (3) the transfer to man or other " incidental host ".

A useful distinction is drawn between " predators " (lying at the apex of a pyramid built up on strata of preys, at the base of which are hundreds or thousands of the simpler forms) and " parasites " (where the pyramid is reversed and increasingly large numbers of small organisms feed on fewer and larger hosts).

Parasites can either adapt themselves completely to their original hosts or spread to new ones. When they adopt the latter course many things may happen. Often a change takes place in the parasite itself, as happens in the evolution of the rickettsioses, primate malaria, blood or tissue flagellates, and arborviruses. A good example is provided by *Rickettsia tsutsugamushi* in its various hosts and localities, and the importance of migration on the one hand and the prevalence in mosaic vegetation and fringe-habitats on the other are stressed. *P. C. C. Garnham*

PAVLOVSKY, J. N. & ZASUCHIN, D. N. **Some Results of Investigations of Natural Foci of Human Infections.** *J. Hyg., Epidemiol., Microbiol. & Immunol.* Prague. 1958, v. 2, No. 4, 385–94. [26 refs.]

This paper gives in a very brief form the current Russian ideas about the zoonoses and infective processes in general, a subject which the first author and his school have made peculiarly their own since the time when they first investigated the synecology of Russian spring-summer encephalitis. [Hoare reviewed this work in 1957 (see this *Bulletin*, 1957, v. 54, 1266)].

By their definition a " natural focus of infection " is practically equivalent to a zoonosis: " A disease, the causal organism of which survives in nature independently of man and is transmitted to man and domestic animals only under certain conditions . . . ". The focus consists of 5 basic components—the organism, the vector, the vertebrate reservoir, the biotope and a favourable external environment. The biotope may be extremely localized in the middle of an otherwise totally unsuitable terrain, *e.g.* gerbil burrows in barren steppes where leishmaniasis flourishes. Such primary " natural foci " may form a medium for the extension far afield of " contemporary foci ". " Polyhost " foci exist, often in association with " polyvectors ". Changes in their seasonal dynamics lead to a flare-up of epizootics and spread of the infection to man. A knowledge of these factors is essential for the control of the disease.

This conception of a " biocoenosis " in regard to the infection as a whole is paralleled by what the authors call a " parasitocoenosis " in the body of man ; a complex of different organisms may be present and these interact on each other, thus *Giardia intestinalis* flourishes well in the presence of tapeworms but is inhibited by *Ascaris* and hookworms.

The Russian workers modestly limit their special contributions in the field to plague, tularaemia, leishmaniasis, some rickettsioses, tick-borne encephalitides, etc. ; an extensive list however is given of major conferences devoted to the subject and held in the U.S.S.R. in recent years. *P. C. C. Garnham*

REPORTS AND SURVEYS

KUPPUSWAMY, S. [M.Sc.], SRINIVASAN, M. [D.Sc., F.R.I.C.] & SUBRAHMANYAN, V. [D.Sc., F.R.I.C., F.N.I.]. **Proteins in Foods.** *Indian Council of Med. Res. Special Report Ser. No. 33.* pp. v + 290, 1958. New Delhi: Indian Council of Medical Research. [Rs. 12.]

This report attempts to set out the information available on the nutritive value of proteins, as determined by biological methods, and their chemical composition in terms of their amino-acid content. Foods are divided into 13 classes to each of which a chapter is devoted. After a short introductory statement, each chapter contains two long tables of information. These are well-documented and there is a bibliography of 1,800 references.

Besides the usual human foods, chapters are devoted to "Leaves and Grasses", "Algae", and "Yeasts, Molds and Bacteria". These reflect Indian interest in finding new sources of protein to supplement the generally inadequate supply from conventional human foods.

But this is an international book and all interested in the protein content of foods will be grateful to the authors for their labour of collecting together so much scattered information into one volume. The tables are well set out and easy to read. A valuable reference book. *R. Passmore*

JÄGER, O. A. **Data on School Health Services in Gondar, Ethiopia.** *J. Trop. Pediatrics.* London. 1959, Mar., v. 4, No. 4, 133–42, 2 figs.

The 20 million population of Ethiopia is served by 7 Ethiopian and 200 foreign physicians. The annual appropriation for public health is 4% of the budget, while education receives 16%. Since the country has never been colonized [save for the evanescent Italian occupation of 1936–1942], Western medicine was introduced barely 60 years ago.

The author describes the health of the schoolchildren of Gondar, an ancient city of 15,000 inhabitants which was formerly the capital of the country and is situated in a good climate at an altitude of 6,000–7,000 feet. In it has been built the Haile Selassie 1 Public Health College and Training Centre, founded with the aid of the U.S. Point IV Plan, UNICEF and WHO. This trains the following categories of medical auxiliary personnel: health officers, community nurses and sanitarians. Since the local school health service is used as a demonstration unit, the health of the schoolchildren of Gondar is particularly well served.

The people of Abyssinia provide an interesting ethnological study since they are descended from Cushites [of Hamitic stock] who emigrated from the Nile valley between 3000–1000 BC, Semites, who came from South Arabia in about 1000 BC, Negro African tribes and probably vestiges of older indigenous races. They are fine-boned and of slender build, obesity being very uncommon.

Though the Gondar district is self-sufficient in food production the intake of animal protein is limited by the frequent fasts imposed by the Coptic church—on 150 days of the year no food of animal origin whatsoever is consumed—and by the custom of regarding cattle as a capital investment rather than as expendible.

The general impression of the author, based on a survey of 3,390 pupils aged from 7–15 years, is that nutrition is modestly adequate and general health

good, though there is a high incidence of latent syphilis. Both boys and girls are relatively lighter for their height than are German or American children. Evidence of protein lack was shown by many of them, though it was never severe; haemoglobin levels were on the whole good, for a concentration of less than 70% (Sahli) was found in only 4·8% of the boys and in none of the girls.

Social custom decrees that the boys be circumcised shortly after birth, while in some tribes the girls are subjected to clitorectomy. The uvula is amputated by a primitive snare and the canine teeth are extracted. Immunity to measles, pertussis and poliomyelitis is universally acquired in early life. Although tuberculosis and leprosy are rife in the adult population, the overall incidence of the latter disease in Ethiopia being 1–1·5%, no examples of active pulmonary tuberculosis were recognized among the schoolchildren and only 8 were suspected of leprosy on clinical grounds. Trachoma is widespread, being diagnosed by an ophthalmologist in 75% of the children, yet its manifestations are mild. Conjunctivitis, other than trachomatous, is common and frequently results in staphylomata. Among other forms of infection, impetigo and suppurative otitis media were prominent.

Parasitic diseases other than intestinal helminthiasis were rare, since malaria is not endemic in Gondar and leishmaniasis is uncommon. Ascariasis was found in 56·7% of the children and trichuriasis in 19·6%, but ankylostomiasis (1·7%) and taeniasis (2·3%) were surprisingly rare. *Entamoeba histolytica* were demonstrated in the stools of 14·1%.

In the school curriculum great emphasis is laid on health education and this has been repaid by a marked and rapid improvement in the cleanliness and well-being of the children. In its under-developed state Ethiopia accords first priority to the preventive aspects of medicine and [wisely] the initial step has been taken to institute a complete school health service. *J. H. Walters*

BOOK REVIEWS

SILVA JÚNIOR, Marcelo. **O Ofidismo no Brasil.** [Snakes in Brazil] 346 pp., numerous illustrations. 1956. Rio de Janeiro: Serviçó Nacional de Educação Sanitária, Ministério de Saúde.

Brazil was once disparagingly described as a garden of snakes. The epithet was probably no more appropriate to Brazil than to many other tropical countries but the early interest shown by Vital BRASIL in the treatment of snake bite by the use of specific antisera focussed a great deal of attention on this aspect of tropical medicine in South America.

This book is in part a tribute to Vital Brasil and the first section is a brief biographical account of this pioneer in the development of antisera to snake venom. The biographical note also traces the founding and development of the Instituto Butantan with which Vital Brasil was so closely associated.

There follows a chapter devoted to general biological aspects of snakes which covers briefly the attitude of primitive man towards them, their anatomy and their geographical distribution.

The second chapter is concerned specifically with poisonous snakes. Detailed diagrams of the structure of the skulls of various types show the way in which

the bite is inflicted, and the series of fangs ranging from those with no more than a simple groove to the complete solenoglyph form with an enclosed canal are illustrated. An account of the methods of collection and preservation of poison for the preparation of antisera is given and this is followed by a section on the effects of the poison of different species of snakes. The clinical pictures of typical cases are described and the morbid anatomy of animals experimentally injected with venom is discussed in some detail.

A third chapter is devoted to the classification and identification of the poisonous snakes of Brazil, special attention being given to the coral snakes.

The remainder of the book is concerned with therapeutic techniques and a bibliography. The illustrations, many in colour, are nearly all derived from other works and their quality varies according to their origins; some are excellent, others of little merit. *C. A. Wright*

British Red Cross Society. **Practical First Aid.** 3rd (Overseas) Edition. 65 pp., illustrated. 1959. Wakefield: Educational Productions Ltd., East Ardsley, Yorkshire. [2s. 6d.]

This booklet is a revised edition of *Practical First Aid Manual*. It is published for the British Red Cross Society and has been revised with the object of bringing the text and illustrations into conformity with the practices established by the joint Senior First Aid Manual of the St. John Ambulance Association, the St. Andrew's Ambulance Association and the British Red Cross Society.

This edition has been designed specially for use in tropical countries and the European figures of its companion volume, *Junior First Aid Manual*, have been replaced with illustrations of African, Indian and Far Eastern peoples. Some of the drawings have been altered to show more adult characters.

This admirable arrangement will clearly make the manual more realistic to people in the countries for which it is primarily intended. In addition, the inclusion of notes on bites from leeches, ticks, mites and chigger fleas, is very appropriate in such a context.

In its technical aspects, the booklet gives a simple, readable and very clearly illustrated account of the various first aid procedures. The coloured diagrams and bold lettering make for very ready memorization of the subjects described.

This adaptation for use overseas of a booklet already in use at home has been made by Air Vice-Marshal Sir Harold Whittingham. It is admirably suited to its purpose. *H. J. O'D. Burke-Gaffney*

Worthington, E. B. **Science in the Development of Africa. A Review of the Contribution of Physical and Biological Knowledge South of the Sahara.** pp. xix + 462, 10 pls. & 15 figs. (1 coloured folding). 1958. London: C.C.T.A.

Since the first edition of this book in 1938 [see this *Bulletin*, 1939, v. 36, 265] great changes have taken place in Africa and science has made great advances, so that a new account of present problems is needed and a statement of what is being done about them. As many of the problems are common

to all or to large parts of Africa South of the Sahara, irrespective of natural boundaries, the material of the book is arranged according to subjects and not geographical areas.

The first 4 chapters, forming Part I, are a general introduction dealing with a broad survey of agriculture, this being the main occupation along with extractive industries, the principles of development, the uses of science, stating the need for its assistance in African development, and describing the inter-African and international arrangements for mutual scientific assistance. Some valuable general deductions are drawn from this review, for example, that in the present state of rapid African population expansion the things to concentrate on are productivity and prosperity even at the temporary expense of social services. It is also urged that annual budgetting for scientific work is unsatisfactory and that block grants for a period of years are more appropriate.

Part II deals with specific scientific subjects, and it covers mapping, geology, meteorology, water and soil. The urgency of converting scientific knowledge and methods into common practice is emphasized. Private ownership of land is being substituted for communal ownership as a means of arresting shifting cultivation, erosion, etc., but cheap methods of land survey are necessary if litigation is to be avoided. The necessity for international cooperation in the control of watersheds and rivers is stressed, and the value of irrigation in causing redistribution of the population and reducing pressure on the existing fertile land is noted. The need to replenish underground water by proper land use is pointed out. Bad agricultural practices, over-grazing, fire and land pressure are the main causes of erosion which continue unchecked in many places.

Part III deals with the flora and fauna inhabiting the environment already described. The complexities encountered in this sphere are revealed by the fact that some 16,000 flowering plants are known in South Africa, a number greater than the entire flora of Europe, and 2,000 species of freshwater fish, as compared with 50 or so in Europe. It is suggested that the antelope should be conserved to provide meat in the wide areas unsuitable for domestic stock while another excellent source of protein is fish. Introduced *Tilapia* give very high cropping rates, 1 ton per acre per year or higher in small fish ponds. The productivity of Africa, it is said, could be doubled and man's misery halved if proved techniques of insect-pest control could be applied everywhere. The locust, for example, will become much more important as the human population expands.

The chapter on agriculture contains many valuable observations and much sound advice. The application of scientific knowledge in this sphere is essential if high sustained yields are to be had. The major problem of African agriculture is the urgency of evolution there which took centuries in other parts of the world. At present farming is on too small a scale; individual ownership in a new system or in a co-operative farm would be better, with scientific advice available to the farmers. The chapter on plant industry gives a most interesting account of how the scientist confronts and surmounts agricultural crises. The scale of their work is shown by the statement that the production of a strain of cotton for Gezira conditions will require half a century.

The final section of the book is concerned with "Human Subjects". In the chapter on health and medicine sound advice is given concerning the technique of introducing new measures to a community. The diseases

discussed are classified according to the mode of life of the people affected since their elimination involves altered social and environmental conditions. It is pointed out that the early stages of civilization are usually associated with a breakdown in tribal discipline and custom leading to insanitary conditions and habits which favour disease. The important point is made that malaria control in rural Africa must be extremely thorough or the frequency of infection will be reduced at the cost of loss of immunity without necessarily resulting in an appreciable reduction in the amount of the disease.

The chapter on the "Science of Man" points out that Africa's ancient history is unique in regard to the evolution of man from his ape ancestor and the development of stone tools. Some better system of preservation of African archeological sites is needed. A subsequent chapter points out the value of the social anthropologist in coding customs for guidance of the administration and in solving practical problems, particularly the replacement of traditional systems, which break down under the strain of development, by new incentives, new values and new economic wants. The important human problem in industry is to reconcile the demand for a higher standard of living with happiness in work. The author, in concluding, points out the danger of losing touch with fact and being carried away by emotion when dealing with social, economic and political matters. Under political and economic pressure the pace of development is too rapid to permit the detached survey and study which are needed as a firm basis for progress.

Three appendices and a bibliography end the volume. The first appendix is a most useful list of the abbreviations used in the text. The second records the principal inter-African scientific meetings held between 1948 and 1956. The third reports, country by country, the scientific institutes, organizations and services in Africa South of the Sahara, recording the size of staff and some comments on the subjects of investigation. There are 15 pages of references. An excellent index is provided and a political map of Africa.

This is a book which should be enjoyed by almost everyone. It is most readably written and it presents a vivid picture of what is going on in Africa in every scientific field. It is a magnificent achievement to have compressed so much information into such small space, but even more valuable are the author's comments and deductions which reflect his intimate knowledge of Africa for over 20 years. It is clear that though many existing problems there have not been solved because they have been insufficiently studied as yet, in many other cases they are thoroughly understood but the difficulties of applying the results in the present social and political circumstances have proved greater than the elucidation of the problem. This volume should be in the library of everyone interested in the development of Africa. *T. H. Davey*

INST. MÉD. TROP. PRINCESSE ASTRID. **Historique du Laboratoire Médical et de l'Institut de Médecine Tropicale Princesse Astrid à Léopoldville.** [History of the Medical Laboratory and the Princess Astrid Institute of Tropical Medicine, Léopoldville] [PIERQUIN, L.]. 59 pp., 4 figs. on 4 pls. 1958, Dec. Léopoldville.

In 1892 the independent state of the Congo was 7 years old, and the disease and death rates in Europeans and Africans were disastrously high. De Marbaix was appointed to undertake laboratory work for the first time, and after

undergoing training at various European centres he opened his laboratory at Boma in July 1894, and was repatriated to Belgium, a victim of malaria, at the beginning of 1896, and died the following year, at the age of 29.

The author traces the subsequent history of this laboratory and mentions the names of the distinguished scientists connected with it—Van Campenhout, Broden, Rodhain, Van den Branden, Van Hoof, Brutsaert and many others. Their work was strenuous and difficult, but they made many notable contributions to knowledge.

The Princess Astrid Institute of Tropical Medicine was conceived as a result of a visit by Van den Branden to the Pasteur Institute in Algiers, and was completed in 1937, though without the air conditioning originally planned. Brutsaert, Neujean and Van Oye directed the work in turn. This institute maintained a special interest in trypanosomiasis, and in 1949 became the headquarters of BPITT until this organization took its own buildings in 1954. Many other activities were included in the programme of work, including work on sera and vaccines.

The author gives more than a statement of the personnel and their activities, he links these with brief accounts of advances in knowledge of tropical medicine made elsewhere in Africa and other countries, and the result is a readable and interesting account of great pioneer work, which is of permanent historical interest. *Charles Wilcocks*

DUBOIS, A. Pathologie tropicale. Vol. I. Infections generales. Affections dermatologiques. 6th Edition. ii ± 199 mimeographed pp. 1959. Vol. II. Maladies intestinales microbiennes et parasitaires, avitaminoses, troubles de la nutrition, accidents causés par des animaux et des plantes, accidents dus au climat tropical. 3rd Edition. ii + 107 mimeographed pp. 1958. Vol. III. Maladies cosmopolites au Congo. 2nd Edition. ii + 86 mimeographed pp. 1958. [**Tropical Medicine. Vol. I: General and Skin Infections. Vol. II: Bacterial and Parasitic Intestinal Diseases, Avitaminosis, Malnutrition. Accidents Due to Animals and Plants and to the Tropical Climate. Vol. III: Cosmopolitan Diseases in the Belgian Congo**] Brussels. Paris: Les Editions "Erasme" S.A.

These three volumes contain the latest versions of the synopses of the lectures on tropical medicine delivered by Professor Dubois, Director of the Prince Leopold Institute of Tropical Medicine, Antwerp, to postgraduate students taking the course of study given there. Their bulk is not due to prolixity, but to the fact that they are made up of bound pages of typescript, only one side of each page being used. Indeed the presentation is admirably concise and didactic, without its being in any way obstrusively dogmatic. The purpose of the lectures is instruction in clinical medicine; the ancillary sciences such as parasitology, bacteriology and hygiene, are touched on only in so far as they have a relevant bearing on clinical medicine; surgery is referred to solely as a line of treatment, and without detail.

The diseases and conditions primarily dealt with are the cosmopolitan and, particularly, the more essentially tropical which are encountered in the Belgian Congo. With most of these it is very evident that the author has had considerable personal acquaintance in that territory. The essentials of other tropical conditions (*e.g.* cholera, Chagas's disease, and bartonellosis) are

summarized in brief compass. Some well chosen historical references, shortly cited, add colour and interest to the accounts of most of the major diseases; there is no attempt at assessment of the literature in the text, but a limited bibliography is appended to enable the student to obtain more detailed information on those diseases which come under the category cosmopolitan.

This collection of lectures most competently and in attractive form fulfils its function as a doctor's introduction to medicine in the Belgian Congo, and as a guide to its practice after he gets there. The blank pages, though they add bulk, afford him space to enter his own notes during his study period in Antwerp, and thereafter. *A. R. D. Adams*

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